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NUMBER 2

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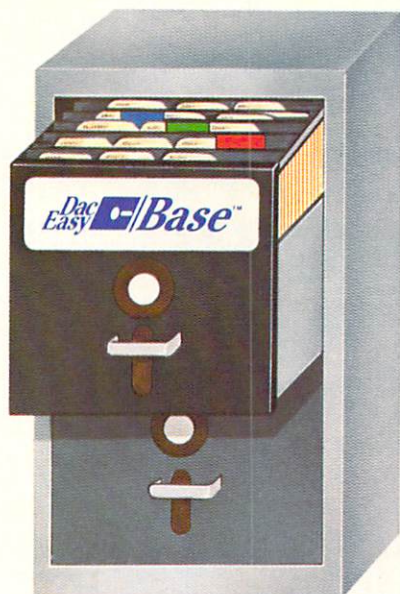
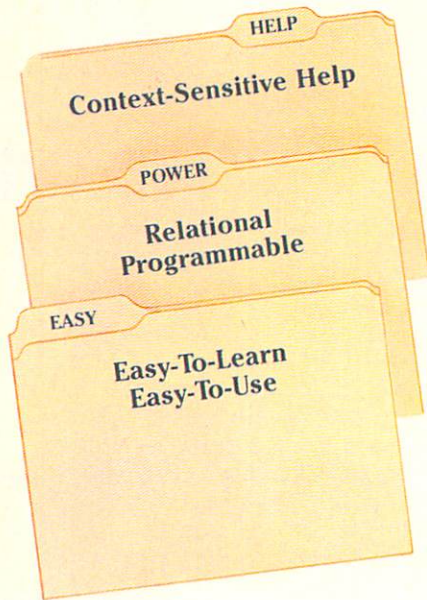
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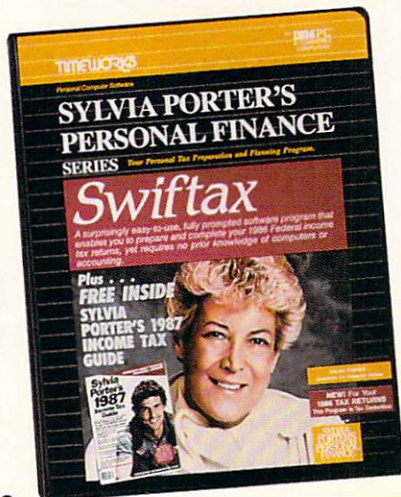
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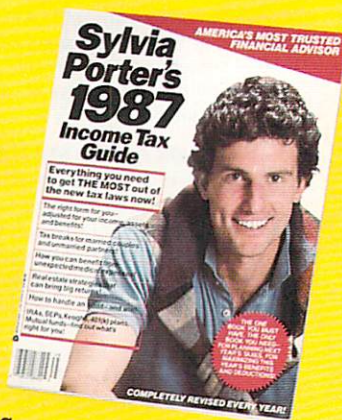
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NEXT MONTH: COMPUTER REPAIR, DIAGNOSIS, AND RESOURCES

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COVER PHOTOGRAPH BY JANET BELLER

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EDITOR'S NOTE

MORE CARE THAN ESTIMATED

The Common Denominator of Puppies, Kittens, Children, And Computers

Some things are irresistible, especially before you actually get them. I think that's what most people find with puppies, kittens, children, and computers (not that you can really compare them). First comes the anticipation, a period of sheer joy at the thought of all the pleasure you'll derive from your new pet or your new baby, or your new thinking machine. We all know how adorable cute little kitties and pups are, how lovable infants turn out to be, and how easy life will become when we enter the computer age.

But get your new acquisition home, and reality hits. It's a long road to the land of bliss. And along the way, you'll need to administer a lot of care.

In our cover story, "The ABC's of Computer Care and Maintenance" (page 45), author Linda Williams provides the new owner with a basic primer and the experienced user with helpful reminders of how to get and keep your computer in optimum working order. Heeding Williams's tips is sure to point you in the direction of hassle-free computing. And if you care for her article this month, you'll want to watch for our March issue and her second installment, on computer repair.

Since this is February, number-one care month, we couldn't leave you without a way to express—electronically—undying love and devotion to special family members and friends. So our Valentine's Day gift to you is Technical Editor Joey Latimer's *Valentine's Card* program (page 64), accompanied by a tutorial that will enable more ambitious programmers to concoct endless graphic designs of their own. Every



month, our entire technical staff devotes hundreds of hours of careful attention to FAMILY COMPUTING's programs, so a special Valentine to Technical Director Lance Paavola, Managing Technical Editor Steven Chen, Technical Editor Pasquale Cirullo, Assistant Technical Editor Steve Feinstein, and Technical Associate Karen Kane, as well as to Joey.

Some long-time subscribers may have noticed by now that our February issue inevitably puts me in a state of excessive mushiness. It extends to all our staff and our readers, many of whom take the time to express your feelings to us, response that means a lot when we're working long hours, against a monthly deadline. We're glad to have this opportunity to be a little sentimental. It never hurts.

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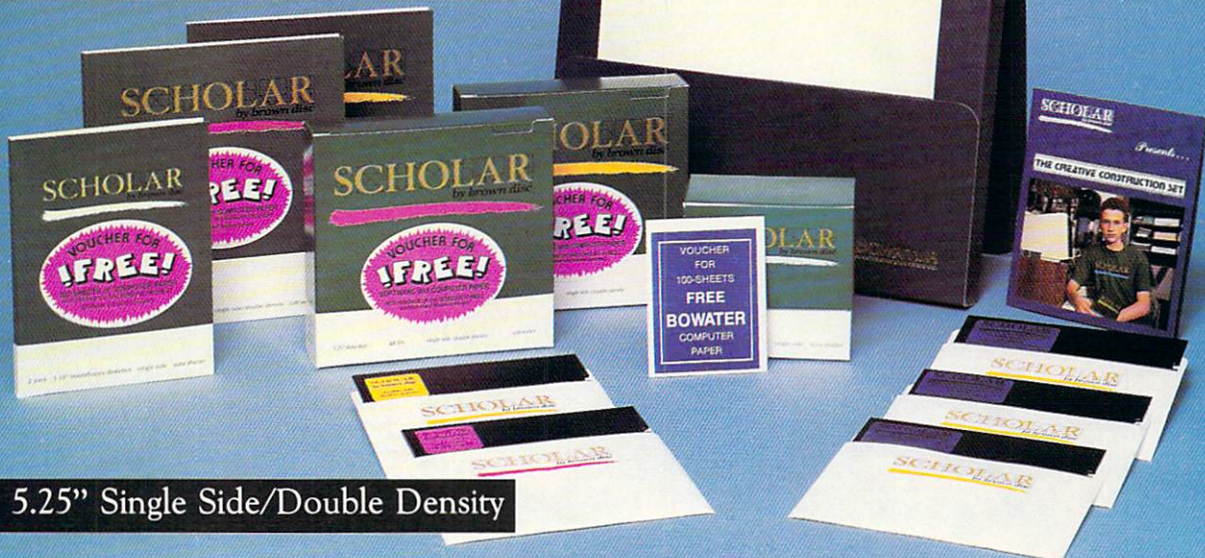
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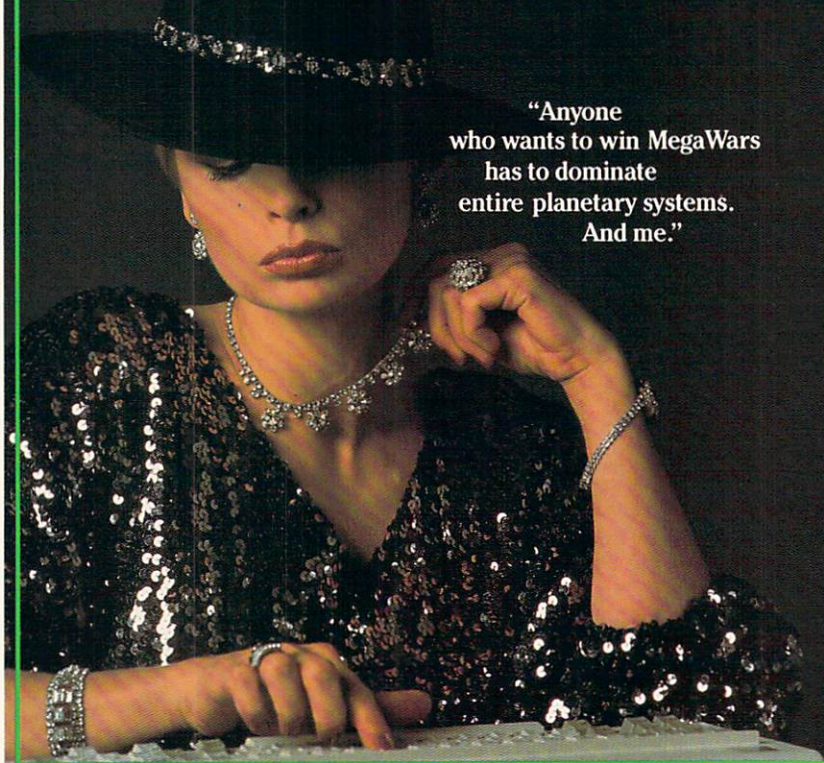
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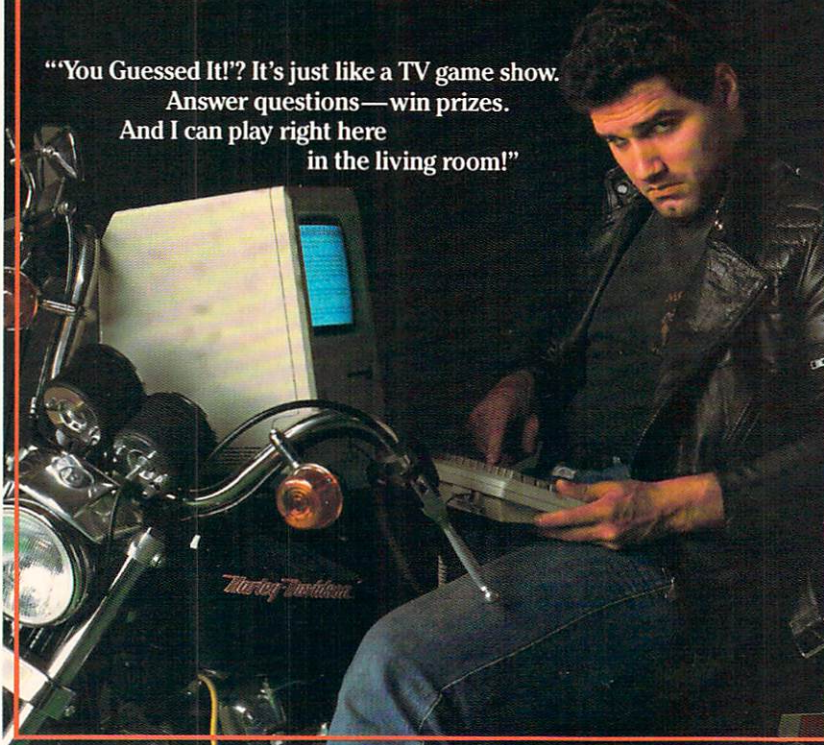
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LETTERS

ACE-ING THE TRS-80

I have been reading your magazine for the past couple of years, and I usually enjoy it very much. However, I need some help with a problem I share with my computer teachers and several of the students in my class. We program in BASIC using Radio Shack TRS-80 computers. My problem comes in when I go home and try to type the program on my Franklin Ace 2100 computer. As you know, the BASIC language commands are not the same for both computers.

We are hoping that in some future issue of FAMILY COMPUTING, you will print some sort of cross-reference so that we can convert TRS-80 programs to run on the Franklin, and vice-versa.

GARY R. PIEPER
Fraser, Michigan

EDITOR'S NOTE: In BASIC Program Conversions (HPBooks; \$12.95), you'll find a comparison of BASIC commands for eight different computers, including Apple IIe and II Plus and Tandy Models III & 4 and Color Computer. Keep in mind that some commands, especially those for graphics, are extremely difficult to convert, and you might not be able to translate every program exactly.

IN DEFENSE OF THE ATARI 130XE

I found your Buyer's Guide in the November issue generally good. Your review of the Atari 130XE was somewhat flattering, yet in my view, disappointing and misleading.

You said, "Because it's near the end of its life cycle, equipment and software will become increasingly hard to find." I must take exception to this statement, and I believe it is

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misleading to the first-time buyer. The 130XE is certainly still being manufactured by Atari.

You neglected to state that equipment and software for the 130XE is available mainly through mail order. I have found ordering by mail very reliable and very convenient, not to mention what I save by not having to pay California sales tax.

ROBERT N. ABRAMS
Glendale, California

EDITOR'S NOTE: While the Atari XE computers are still being manufactured and sold, they are not as widely distributed as they once were. For current owners, who have their systems in place, this presents no real problem. But new buyers will find that not much new XE software is being written, and existing software can be hard to locate.

Many readers have expressed dismay at my unfortunate "end of its life cycle" reference to the XE—but just as many have complained about lack of service and the difficulty of finding peripherals and software for their XEs.

In making such a strong statement, I did not intend to demean Atari computers, which I have long admired for many reasons. I meant to tell first-time buyers—the prime readers of any Buyer's Guide—that they'll have a much easier time assembling and using an Atari ST system and won't spend much more money.

—NICK SULLIVAN
Senior Editor

COPY-PROTECTED SOFTWARE

As the owner of a computer with a hard-disk drive, I have decided to buy software that's not copy-protected, except for games. It would be very helpful if your listings on software indicated NP or CP to show nonprotected or protected status.

The job of recreating or backing up protected software will be too onerous to justify its purchase, as long as good nonprotected programs are available.

ROGER THOMAS
Lawrenceville, New Jersey

EDITOR'S NOTE: Our Software Guide department has always indicated programs that are not copy-protected by using the phrase "User makes backup." Starting with this issue, however, lack of copy-protection will be stated more clearly by the phrase "Not copy-protected." Hope that helps!

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HOME-SCHOOL CONNECTION

WHEN A HANDICAP ISN'T A HINDRANCE

Computers Remove Barriers Caused by Blindness, Deafness, Paralysis, and Other Physical Disabilities

BY MARY EFFERTZ TOUGAS

Fifteen-year-old John Duganne, of Santa Monica, California, was born with cerebral palsy, a disability that causes varying degrees of muscle incoordination and speech disorders. Because John has very limited control of his hands, he cannot write legibly. As a result, his schoolwork suffered—until a few years ago when his mother, Mary Ann Duganne, and stepfather, Hal Glicksman, bought him an Apple II computer.

With some software modifications and a special keyboard, John learned to use *Bank Street Writer* (Broderbund), a word-processing program originally designed especially for children. John uses a Zygo head wand (Zygo Industries), a device that he manipulates with his chin to type on the keyboard. He also uses the head wand with other programs, such as *Blazing Paddles* (Baudville) and *The Print Shop* (Broderbund).

John, now a ninth grader, is at the top of his English class and loves creative writing. "If it hadn't been for our computer, his life would not be the same," says his mother. "It would be really limited."

Mary Ann Duganne is just one of many parents to witness how computers can alter the course of a disabled child's life. With some modifications and additional peripherals, the same machine you use to keep your checkbook or to play *Flight Simulator* can help a hard-of-hearing child communicate with classmates or a paralyzed student write a school report. Computers can bypass traditional learning methods and can help both children and adults keep up to speed with their non-handicapped peers; they create speech for the nonvocal, telephone use for the deaf, voice for the blind,



Jason Braam, 10, who has multiple handicaps, using his computer.

and control for the physically handicapped. If a severely handicapped person can move an eyebrow, a lip, or a finger or blow through a straw, he or she can operate a computer.

GETTING IN CONTROL

Alice and Peter Braam, of Kasota, Minnesota, have discovered how computers can help their three physically limited children, two of whom are foster children. The family learned about the advantages of computers through Closing The Gap (CTG), a company in southern Minnesota that specializes in dispensing information concerning computers for the disabled.

"I had read many articles about computers but didn't know what to buy," Alice said. "So I brought all of the children to Closing The Gap, and the people there tried out different things to see what would work." The computer has been a mainstay in the Braam household ever since.

The Braam computer's greatest potential is with 10-year-old Jason. He is a quadriplegic and is blind, non-verbal, retarded, and epileptic. Before the Braams bought a computer, Jason's only way to communicate was to smile, laugh, frown, or cry. Now that a computer has made its way into the Braam house, Jason has found another way to communicate; the computer talks to him via a speech synthesizer and he responds using a Yes/No switch (Marblesoft) or a PowerPad (Dunamis Inc.). One program Jason has learned to access lets him choose hard, soft, bumpy, or smooth textures that are placed

on his PowerPad. And another lets Jason choose nursery rhymes. "It gives him some control over his surroundings," said Alice. "He can push something and something happens."

Seven-year-old Cristina Rubke, of Moreno Valley, California, also uses her computer to control her environment. Born with arthrogryposis multiplex congenita, a condition leaving her unable to move her arms and legs, Cristina uses a modified Apple IIe computer system, developed by Cascade Graphics Systems. Cristina can use the computer, which is voice-activated, to complete such tasks as opening the garage door and making phone calls. She calls up a menu and tells the computer what phone number to dial. The computer dials the phone for her, and she can talk right into a voice box attached to it. With the aid of a mouthstick that she uses to press the keys on a keyboard, she can word process her schoolwork and personal letters. "But the thing she uses the computer for most is phoning everyone on the planet," said her father, Chris.

With the help of a parents-of-disabled-children group in Redondo Beach, California, the Rubkes are continually learning how to remove barriers that Cristina faces in school, as well as future obstacles she'll face in the workplace. "She can work for any company she wants to someday," says Chris. "She's going to be able to avail herself of jobs along with everybody else with equal education and background."

WHAT HELP IS AVAILABLE?

There are many places parents can turn to for help in finding hardware, software, and special adaptations for their children's disabilities. One logical starting place is the schools. Unfortunately, because of tight budgets and other factors, schools are often sorely lacking in both adequate computer resources and properly trained

MARY EFFERTZ TOUGAS is an editor at *Closing The Gap*, an organization specializing in enabling handicapped individuals to use the computer to overcome their disabilities.

RESOURCES

ORGANIZATIONS

Closing The Gap (P.O. Box 68, Henderson, MN 56044; [612] 248-3294); publishes a bimonthly newspaper and an annual resource guide; operates CTG Solutions, a data-base service offering quick answers to inquiries; provides in-house courses and conducts workshops.

Trace Research and Development Center on Communication Control and Computer Access for Handicapped Individuals (1500 Highland Ave., Madison, WI 53705; [608] 262-6966); provides informational materials upon request; conducts a series of training courses including "Selection & Application of Microcomputers for Handicapped Children."

The Center for Special Education Technology (Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091; [800] 345-8324 between 2 p.m. and 5 p.m. EST); the government-funded project operates an extensive data base and offers free searches to anyone.

Disabled Children's Computer Group (DCCG, P.O. Box 186, 7230 Fairmount Ave., El Cerrito, CA 94530; [415] 528-DCCG); established a public access Computer Resource Center to help families and professionals identify appropriate available computer resources.

The National Parent CHAIN (Coalitions for Handicapped Americans Information, 867-C High St., Worthington, OH 43805; [614] 431-1911); operates a Special Net

Bulletin Board.

Parentele (5538 N. Pennsylvania St., Indianapolis, IN 46220; [317] 259-1654); a national coalition created and operated by volunteer parents and friends of those with handicaps; publishes a quarterly newsletter, *Crisscross*.

The National Technology Center (American Foundation for the Blind, 15 West 16th St., New York, NY 10011; [212] 620-2077); operates an information network that contains four data bases for blind and visually impaired users.

BOOKS

Microcomputer Resource Book for Special Education (\$18.95 softcover, \$23.95 hardcover); by Dolores Hagen, 1984; available from Closing The Gap, P.O. Box 68, Henderson, MN 56044.

The Rehab/Education Technology Resource Book Series: Communication, Control, and Computer Access for Disabled & Elderly Individuals (three-book series \$24.50-\$29.50); all books are available from the Trace Research and Development Center on Communication Control and Computer Access for Handicapped Individuals; Little, Brown and Company, 34 Beacon St., Boston, MA 02106.

From Toys to Computers: Access for the Physically Disabled Child (\$20); by Christine Wright and Mari Nomura, 1985, 1986; available from the authors; P.O. Box 70242, San Jose, CA 95170.

dors; weekend workshops for hands-on experiences; a print library of materials relating to computers, disabilities, and special education; and an electronic bulletin board, available via modem ([415] 642-7387), which posts DCCG news and information and offers the opportunity for social interaction between group members.

WHAT'S NEXT?

So now that you've heard stories about others' successes, it's time for you to show a disabled family member—whether it's your child, brother or sister, mother or father, or someone else—how computers can make a difference. With the help of the organizations, publications, and companies mentioned in the accompanying boxes, you can help make independence a reality for a disabled person. ☐

MANUFACTURERS

Adaptive Peripherals, ([203] 633-2610); Baudville, ([616] 957-3036); Broderbund, ([415] 479-1185); Cascade Graphics Systems, ([714] 474-6200); Dunamis, Inc., ([404] 476-4934); Marblesoft, ([612] 434-3704); Zygo Industries, ([503] 297-1724).

instructors. Your child's school may, in fact, have a specialist who knows a lot about the uses of computers for the handicapped. If so, pick his or her brain. If such a person doesn't exist, encourage your school district to dedicate more time and money to your child's cause. You may even want to show teachers and school officials the software, hardware, and other devices you've found.

The best sources for most parents are, without a doubt, other parents. Parents of handicapped children are joining together all over the country to share information. In the San Francisco Bay Area, a parents' advocacy group called Disabled Children's Computer Group (DCCG) was formed to link special-needs children with computer technology. DCCG has established a public access Computer Resource Center to help parents, children with disabilities, teachers, and rehabilitation professionals identify appropriate available computer resources.

DCCG offers a variety of services to its local community: meetings featuring presentations by parents, professionals, and commercial ven-

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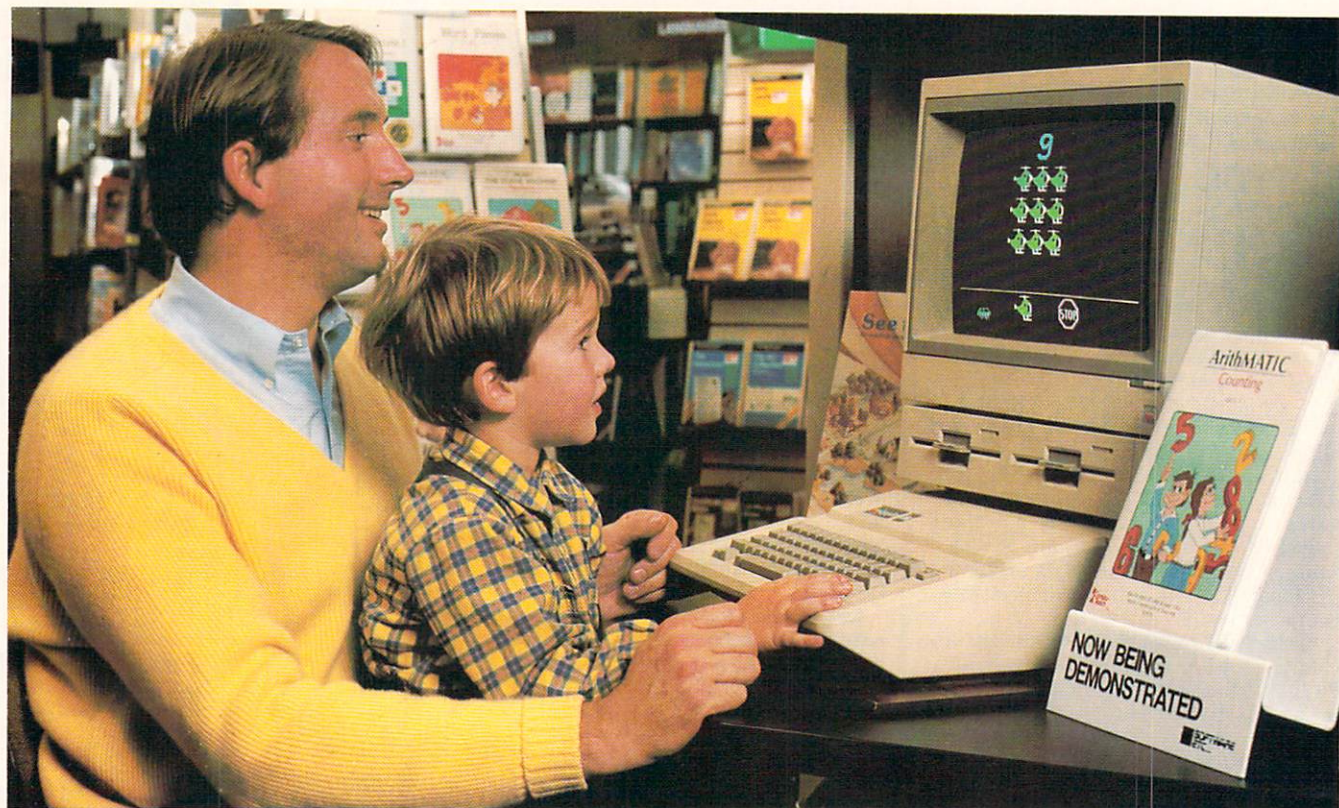
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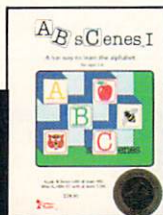
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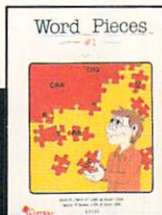
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HOME OFFICE

SHOW—DON'T TELL

Use a Graphics Program to Create Pictures out of Numbers

BY ROGER HART

With the right software, and the right imagination, you can use your computer at home to enhance the way you communicate ideas at work. That's what Gary Saxton did.

Gary, who is the manager of manufacturing control at a large chemical manufacturer, was asked to see what effect increasing production would have on the cost of each unit. He knew that certain plant operating costs—electrical consumption, raw materials, scrap, and rejects—would increase evenly as production increased. Other costs—adding new shift workers, for example—would add a spurt of costs only at certain levels of output, while others would remain fixed.

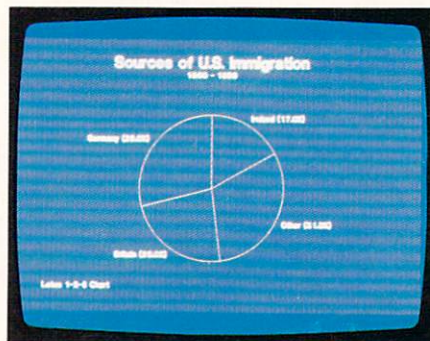
Gary's job was to figure out how much the company could produce, and still keep the unit pricing competitive.

THE SPREADSHEET AS A PICTURE

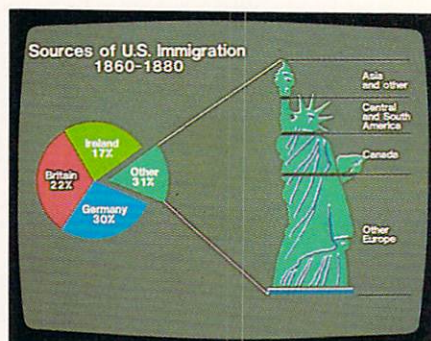
Traditionally, Saxton had done this kind of analysis exclusively with a spreadsheet and presented columns of numbers to management. This time, he chose to look at the problem using graphics. But there was one problem—the company was numbers-oriented and didn't even have graphics software.

At home, though, Gary had an Apple Macintosh with *Multiplan*, a spreadsheet, and *Microsoft Chart*, a graphics program. He converted all his spreadsheet data into graphs of various kinds. At his presentation to management, he had chart after chart, showing every possible condition that the plant could encounter.

Gary graphically proved that by increasing production, overall costs would actually be lower. Thus, the company could drop the selling



You can take a simple 1-2-3 graph and dress it up for presentation with *Freelance Plus* (Lotus).



price. As a result of his presentation, the company increased production. And because of the price drop, it wrote several significant new orders.

ANALYTICAL GRAPHICS

There are two general types of business graphics—analytical and presentation. The lines between these two types were once clearly drawn, but now there's considerable overlap. However, understanding the basic difference between the two will help you shop for the right package.

Analytical graphics usually consist of line graphs, bar charts, and pie charts. These bare-boned graphics are useful for seeing relationships that would be difficult to otherwise observe. Most analytical programs allow you to add text along the bottom or side, to help explain a point.

PRESENTATION GRAPHICS

When you need to impress people, however, you should turn to a presentation graphics program. It will give your data a snazzy look, sometimes with a 3-D effect.

With a presentation graphics program, you can create fancy multicolored charts and graphs from raw data—or take analytical graphics you've previously prepared, and dress it up. Some spreadsheet packages already have multicolored graphs incorporated in their analytical programs.

With presentation graphics software, you can add text in different sizes and styles. Some programs

even allow you to design special logos, and you can fill in shapes and designs with a variety of patterns.

Many presentation graphics programs will accept data from spreadsheet and data-base files (usually any data stored in DIF or SYLK format). For instance, your data-base files on customers could be arranged in graphic form to show the average purchase order size for each sales region. Another graph could show cost per sale call for each territory. A final graph could depict the sales-call cost per hundred dollars of orders received for each territory.

HARDWARE REQUIREMENTS

Can any computer produce business-style graphics? In theory, yes—as long as you have the right software. But some computers are better suited than others. Using graphics can gobble up lots of memory, so the more RAM you have, the better the effects you'll be able to create.

New computers, such as the Apple Macintosh, Commodore Amiga, and Atari ST, can produce more stunning graphics displays and printouts than older computers, such as the Apple II, the Atari XE, and the Commodore 64/128.

And on the IBM PC and compatibles, you need a graphics adapter of some sort. Most graphics software requires a color/graphics adapter or enhanced graphics adapter; some works with a monochrome graphics adapter as well.

A color monitor is helpful, but you can prepare color charts without

Contributing editor ROGER HART wrote "Desktop Publishing," in the September 1986 issue.

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one—either with a color printer or by hand coloring. Monochrome monitors, of course, won't show colors, but most software will substitute different shades to represent different colors. Even a Macintosh, with its black-and-white screen, can generate color graphs and charts with a color printer and the proper software.

PRINTING OUT

A clear, concise, graphics presentation is not much good if it's stuck inside your computer. The logical step is to print your graphics.

You can, of course, use a regular

black-ink dot-matrix printer. If you design hollow outlines, or use light shades of gray, you can color in the section with color marking pens.

Even better, most photocopiers can be used to make an acetate transparency of your printout. Replace the paper in your office photocopier with transparency film, which you can buy at an office supply store. Make a copy of your printout on transparency film. Then use acetate coloring pens to create a vivid overhead transparency. Some printers print color directly on acetate.

Of course, the easiest method is to

use a color printer, since most graphics software supports color printers.

CAREER BOOST

Using your computer at home in this way can give your career a significant boost. After all, with more and more data being analyzed and presented via computers, the more you know about computers, the more valuable you are as an employee. Show your ideas (and numbers) with computer pictures. Your ideas will look better to your employers—and so will you. **RE**

BUSINESS GRAPHICS AND CHARTING SOFTWARE

Product Publisher Phone #	System Requirements	Price	Reads Outside Files?	Comments
AlphaChart, CurvePlotter, 3D Chart Spectral Graphics Software (800) 826-2989 (800) 231-7316 (in CA)	64K Apple	\$30 each; \$50 for 3	No; stand-alone package.	Three-month money-back guarantee; charts in b/w and color, but will not print in color.
B/Graph Batteries Included (416) 881-9816	48K Apple II, 48K Atari	\$40	Lotus's 1-2-3 and PFS:Series; reads ASCII and DIF files.	Does pie charts.
ChartPak-128 Abacus Software (616) 241-5510	Commodore 128	\$40	BustCalc, CalcResult, and MultiPlan.	Works with the keyboard or lightpen.
Cricket Graph Cricket Software, Inc. (215) 387-7955 (800) 662-2444	512K Macintosh, Macintosh Plus	\$195	Works with most spreadsheet, clipboard and scrapbook programs; reads ASCII files.	Wide range of scientific plotting. Handles large volumes of data (2,000 data points per series).
Fast Graphs Innovative Software, Inc. (913) 492-3800	128K IBM PC and compatibles; graphics adapter.	\$140	Lotus's 1-2-3, MultiPlan, PerfectCalc, SuperCalc, VisiCalc; reads ASCII, DIF, and SYLK files.	Designed for the inexperienced computer user, according to publisher.
Freelance Plus Lotus Development Corp. Graphics Product Group (617) 494-1192	384K IBM PC and compatibles; graphics adapter.	\$495	dBase II/III, Lotus's 1-2-3, Symphony; reads ASCII.	A single package that includes charting, chart-editing, diagrams, word charts, free-hand drawing, symbols, and mapping.
geoChart Berkeley Softworks (415) 644-0883	Commodore 64/128	\$40	geoCalc.	Can produce line charts, pie graphs, histograms; requires GEOS.
Graph-in-the-Box New England Software, Inc. (800) 633-2252 (203) 625-0062	256K IBM PC and compatibles; graphics adapter.	\$98; (\$148 for non copy-protected)	dBase II/III, Lotus's 1-2-3, MultiMate, MultiPlan, Turbo.	A memory-resident graphics program; provides instant analysis of data.
The Graphics Department Sensible Software, Inc. (313) 258-5566	48K Apple	\$125	Reads DIF Files.	Can enter data points to see instantly how it looks.
Harvard Presentation Graphics Software Publishing Corp. (415) 962-8910	256K IBM PC and compatibles; graphics adapter.	\$395	Lotus's 1-2-3; reads ASCII files.	Produces professional quality text charts, organization charts and graphs in the form of overhead transparencies, paper copies, or 35mm slides.
Impact! Aegis Development, Inc. (213) 392-9972	512K Amiga with external disk drive, color printer	\$200	Reads ASCII files.	Slide-show presentation module built into program.
Microsoft Chart Microsoft Corp. (206) 882-8080	256K IBM PC and compatibles, Macintosh; graphics adapter, DOS 2.0 or higher (for IBM)	\$125 (Mac); \$295 (IBM)	dBase II/III, Lotus's 1-2-3, MultiPlan, Symphony; reads ASCII, DIF, and SYLK files.	On-screen editing of charts; 8 built-in functions for data analysis.
PFS Graph Software Publishing Corp. (415) 962-8910	48K Apple IIc/IIe, 128K IBM PC and compatibles; graphics adapter (for IBM)	\$140 (IBM); \$125 (Apple)	Can merge data from PFS:File or PFS:Professional.	Pie, line, bar graphs and charts; displays up to four different charts in one graph.
Visualizer PBI Software, Inc. (415) 349-8765	512K Apple IIGS	\$100	AppleWorks.	Utilizes all the advanced features of the GS. Mac-like interface. PBI also publishes GraphWorks for Apple IIe/IIc.

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An 8-processor chip for a "non-Von" computer. Actual size at right.

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WRITING A WILL

With Specialized Software, You Can Write a Will, and Always Keep It Up-to-Date

BY MATTHEW STERN

My father died last summer. It was difficult just dealing with my grief alone. After all the funeral arrangements had been made, I was faced with a more difficult task: handling my father's estate. Fortunately, my dad had prepared a will and had chosen an executor and a good probate lawyer to execute it. While I have many other problems to resolve, my dad's planning relieved me of figuring out how to distribute his property.

Unfortunately, more than two-thirds of all adults die without a will, according to a *Consumer Reports* article. Many people don't understand what goes into a will or don't want to pay an attorney to prepare one. However, your personal computer can solve both of these problems. It can help you analyze your estate and write a legally valid will.

WHAT A WILL IS... AND ISN'T

A will is a legal document that expresses your wishes on how your property is to be distributed after you die. The type of property you would bequeath in your will includes real property (your home, a vacation cabin and parcels of land) and personal property (such as cars, jewelry, family heirlooms, etc.). Life insurance, checking accounts, and property you own jointly with your spouse automatically go to the beneficiaries and do not need to be included in your will.

To make sure your estate is distributed as you requested, you need to appoint an executor. If you have children who are minors, you may also name a guardian to take care of

them and a guardian to manage their assets until they become adults. Some wills include instructions for setting up trust funds for children.

It is important to prepare a will correctly, because after you die, it is submitted into probate, a legal proceeding that checks its validity. If your will is correct and up-to-



date, probate should not take more than a few months. If you leave an outdated, incorrect will or no will at all, it will delay probate, and your property may not be distributed as you intended.

HOW A COMPUTER CAN HELP

However, there is more to preparing a will than just writing it. You will also need to keep track of your property, liabilities, and insurance records. Your computer can help you with that, too.

A data base is ideal for this type of task. You can list your personal assets and their present value. For real estate, you can also give the location of the deed and other important papers. Not only is this list useful in preparing your will, it will also help you recover your property or file insurance claims if it is lost, stolen, or destroyed.

It is also important to list your insurance policies, especially life in-

surance. Your data base can also store this information.

Your will should make some provision for paying off your bills, because your personal debts must be paid before any property is distributed to your beneficiaries. You should keep track of how much you owe your creditors, simply because it is sound financial management. For such record keeping, you can use an integrated financial program with balance sheet capabilities. MECA's *Andrew Tobias' Managing Your Money* (for IBM PC and compatibles and Apple II) and Timeworks' *Sylvia Porter's Your Personal Financial Planner* (Commodore 64/128, IBM PC and compatibles, Apple II, Macintosh and Atari ST) also keep track of your assets and insurance policies.

Be sure to keep this information in a safe, confidential place where it can't be easily damaged or stolen.

WILL-WRITING PROGRAMS

If you are already knowledgeable about wills, you could type one out on your word processor (as your lawyer probably does). There are a number of good books available that can help you write your document in correct legal form and style. But for most of us who don't feel comfortable around legal jargon, there are several will-writing programs and prewritten templates.

Nolo's *WillWriter* (IBM PC/PCjr, Commodore 64/128, Apple II, Macintosh; \$40-\$50) is the best known will-writing program, and the easiest to use. *WillWriter* is a stand-alone "fill in the blank" type of program. It asks you a series of questions about your family, property, and how you want to distribute it. After you enter your information, it generates a will with proper legal terminology. Your will can be easily updated as your circumstances change. The *WillWriter* manual is clearly written and gives helpful hints on estate plan-

MATTHEW STERN is a regular contributor to FAMILY COMPUTING. You can address questions to him in the FAMILY COMPUTING Forum on CompuServe (GO FAMFORUM). His ID number is 73547.2420.

ILLUSTRATION BY JERRY McLAUGHLIN

ning and explains the different property laws in most states.

DiskWILL (Self Help Legal Services; for Commodore 64/128, Apple II, IBM PC and compatibles, and TI Professional; \$25-\$30) works along the same lines as *WillWriter*. A simple text editor lets you write your bequests and the program adds the necessary legal information. You can preview your will on the screen before printing it out. As with *WillWriter*, your original will is saved on the disk so it can be modified later.

PREWRITTEN WILLS

There are also a number of "template" programs that come with files that you can change to suit your needs. HDG Software's *LegalEase* (IBM PC; \$130) and Haba/Arrays' *Haba Solutions: Wills* (for Apple II, Macintosh, and Atari ST; \$50) come with prewritten will files you modify with a word processor. (The ST version of *Haba Solutions: Wills* comes with its own text editor, and *LegalEase* includes the word processor *PC Write*.) The manuals give you instructions on where to enter the information and how to rephrase it for your particular circumstances.

WHEN YOU SHOULD SEE A LAWYER

While will-writing programs make it easy to write your own simple will at home, you should see an attorney in the following cases:

... If you have special circumstances. Most will programs tend to be generic, so they can be used by most people. They may not address specialized bequests such as copyrights, royalty payments, and overseas properties. For these, you should see a lawyer, especially one who specializes in these fields.

... If you live in Louisiana. Louisiana's property laws are completely different from those in the rest of the United States, and most will-writing programs do not make provisions for them. You should consult your attorney.

... If your estate is over \$600,000. Estates of that size require special treatment and professional planning.

... If you wish to disinherit a spouse or a child. Disinheriting isn't just to force your kid to go to

college or to punish your daughter for dating that creepy boy down the street. You may want to disinherit a spouse or child for whom you have made other arrangements, such as life insurance or joint property. However, many states restrict you from disinheriting your child or spouse altogether. You will need a lawyer who understands these laws and can explain your intentions when the estate goes into probate.

You should see a lawyer whenever you have a question about your will. It is also a good idea to have an attorney review your will after you finish it, since virtually all software publishers disclaim liability for any problems that occur as a result of using their product. You'll still save a lot more money than if the lawyer wrote your will from scratch.

EXECUTING THE WILL

After you finish your will, there is one final step in preparing it. You have to execute it, which means that you sign it before witnesses, make sure it is properly notarized (if needed), and store it in a safe place.

If you are considering storing your will in a safe deposit box, don't just sign your name on it and toss it in. It is advisable to make three or four copies of the original will and give them to your executor and alternate choices (if necessary). After your death, your executor presents the bank with a copy of the will and proper identification, and he or she receives the original will.

The court needs to know that you actually signed the will and did it "with sound mind and body" and not under duress. This is why you need your signature witnessed. *WillWriter* and *Haba Solutions: Wills* print spaces for you and your witnesses to sign.

You may also notarize your will, although it isn't necessary in most states. *Haba Solutions: Wills* comes with a notary clause you may paste at the end of the will.

A will can give you and your family peace of mind. I know my father's will did for me. ☐

COMPANIES

Haba/Arrays, (818) 994-1899; HDG Software, Inc., (617) 651-1881; MECA, (800) 631-MECA; NOLO, (800) 445-6656 (in California) or (800) 992-6656; Self Help Legal Services, (612) 924-3323; Time-works, (312) 948-9200.

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PLAY SYSTEMS

The Road Maps of Computer Gaming

BY JAMES DELSON

Whether you're playing a basketball simulation, flying a jet, or participating in a fantasy role-playing adventure, the basic "road map" of every computer game is called its play system. While no two games are exactly alike, play systems tend to contain a combination of elements that are fairly consistent from program to program. How does it help you to know about these elements? Well, by understanding the ways games are structured, it's quite possible you'll become a better player, win more often, and have more fun.

A play system is the skeleton over which everything else in the game program is built. It organizes and directs the flow of a game, keeps the events moving at a lively pace, introduces elements of chance, provides computer opponents, and makes sure you have a good time. In short, the play system is the heart of a game. For instance, the classic role-playing adventure *Wizardry* (Sir-Tech) draws players into a fantasy world of myths and legends. Its play system combines elements found in practically every game with other elements that are unique to its popular genre. Those parts of a play system which appear most often along a game's path are explained below, as we illustrate how a play system operates by dissecting *Wizardry* and comparing it to other games.

1. THE BIG PICTURE

Wizardry allows one or more players to control a team of fantasy he-

roes on a dangerous but winnable quest. Other basic ideas for computer games include learning and applying the skills of flying an airplane, as in *Flight Simulator II* (subLOGIC), or a space vehicle, as in *Lunar Explorer* (Electric Transit). In *Archon* (Electronic Arts), you master a batch of multiskilled "icons" and use them to dominate a playing board, while the concept of *Lode Runner* (Broderbund) demands that you leap your way through multiscreen mazes, while avoiding bad guys.

2. WHAT'S THE POINT?

The goal of *Wizardry* (*Proving Grounds of the Mad Overlord*) is to defeat the evil Werdna, recover an ancient amulet, and have your characters rewarded with a great symbol of achievement. Other games offer complex goals such as the political prestige you gain while maintaining the shaky peace between the U.S. and the Soviet Union in *Balance of Power* (Mindscape), or deliciously simple ones, such as outscoring another basketball player in *GBA Championship Basketball* (Gamestar/Activision).

3. WHO ARE THOSE GUYS?

In *Wizardry*, you create characters to stand in for you on the computer screen by selecting a male or female example from the races (human, elf, hobbit, and dwarf) that appeal to you, then have your characters' abilities as thieves, fighters, spellcasters, and healers determined by a random selection process. Different role-playing adventures, such as the *Ultima* (Origin Systems) and *Phan-*

tasy series (Strategic Simulations, Inc.), offer a wider variety of racial and character types, but their method of character generation is quite similar.

Many games—especially in such genres as financial or political simulations, board-game adaptations, and text-only or text/graphic adventures—have no character generation, as the players are the active participants. For example, in an adventure such as *Wishbringer* (Infocom/Activision), you play only with the characters built into the program.

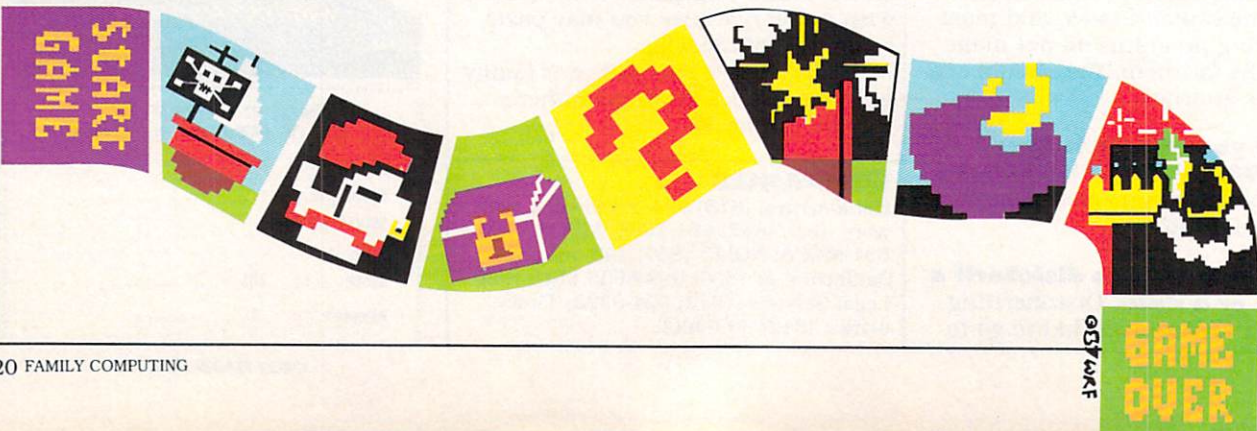
4. FROM SWORDS TO SPACE LINT

New *Wizardry* characters purchase the minimal equipment (arms and armor) necessary to begin their adventures, but as they search the dungeon for clues to finding the amulet, they win or discover better quality weapons and armor, as well as magical items that help in combat, movement, and spell casting. Ultimately, it is only through your ability to utilize these special items that you can win. Equipment in other games' play systems can vary from as complex an item as the heavily armed combat vehicles in *AutoDuel* (Origin Systems) to a rather innocuous bit of space lint in *A Hitchhiker's Guide to the Galaxy* (Infocom/Activision).

5. KEEP ON MOVING

Moving around in *Wizardry* is very straightforward; directional keys simulate a walk through the labyrinth. Some adventures use joysticks or mice as well as keys, but the ba-

JAMES DELSON is a contributing editor for FAMILY COMPUTING.



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Tandy 1000/IBM PC Jr. screens shown



"0300 Hours. Two hours until dawn. Radar picks up convoy, escorted by two destroyers. We believe that one of the enemy's valuable cargo ships is part of convoy formation."



"0400 Hours. Lookouts on the bridge. Target identification party reports one cargo ship, 4,000 tons, troopship of 10,250 tons, with two Kaibakan-type escorts. Moving into attack position."



"0500 Hours. Sound General Quarters! Battle stations manned. Preparing for torpedo run. Gauge Panel OK. Periscope OK. Charts and Attack Plot Board OK. All mechanical systems OK."



"0525 Hours. Torpedo rooms report full tubes forward and aft. Battery at full charge for silent running. We hope water temperature will provide thermal barrier to confuse enemy sonar."



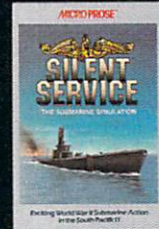
"0600 Hours. We are at final attack position. Convoy moving at 10 knots. Target distance decreasing rapidly... Crash Dive! Escorts have spotted us and are turning to attack! Rig to run silent."



"0700 Hours. Depth charged for one hour. Some minor damage, but repair parties at work. Destroyer propeller noises receding. We'll come to periscope depth for our return punch."



"0715 Hours. Torpedo tubes 1, 2, 3 fired. Two destroyers hit and sinking. One of the enemy's last cargo ships coming into 'scope view—an ideal target position. On my mark... Fire Tube 4! Fire 5!"



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ENTERTAINMENT

sic movement is the same—north, south, east, or west. More sophisticated methods for moving around the playing field are to be found in such games as *Jet* (subLOGIC); you don't just steer the airplane, but control it by (among other things) computing airspeed and adjusting the angle of flight. In *Archon II* (Electronic Arts), the movement system is similar to chess, in which various pieces on the play board move different ways, except instead of simply moving horizontally or diagonally like rooks or bishops, your *Archon II* pieces fly, skate, swim, and skitter.

6. WHERE ARE YOU GOING?

The play area where *Wizardry* takes place is a three-dimensional black and white simulation of a vast, multileveled underground labyrinth. At the best of times, you can only see a few paces ahead of you, and at its most distressing, you're stuck in the dark. Special map features include one-way and secret doors, pits, traps, chutes, and elevators. The map elements found in other play systems run from the particularly realistic simulation of the actual Pennsylvania battlefield terrain found in *Gettysburg: The Turning Point* (Strategic Simulations Inc.) to the simple but colorful screens of the rollicking arcade game, *BC's Quest* on *Tires* (Sierra On-Line), where you roll along under trees, over rocks, and into streams.

7. THE CORE OF WINNING

A game is won, or reaches its conclusion, when you use one or more strategies to accomplish the goals put in by the game's designer. With *Wizardry*, strategy revolves around players being able to raise their characters' ability levels. To do this, you must send your heroes into the dungeon, where they fight a few battles to gain experience points and treasures. Then you make them exit the labyrinth periodically to elevate their abilities by spending a night in the inn. While out of the maze, they can also buy newer and better weapons, sell the treasures they discovered inside, and even be raised from the dead. In order to pursue this strategy, you must keep track of where your adventurers are by mapping each of the dungeon's levels and noting all their special features.

The overall design of *Wizardry* is extremely flexible, allowing gamers to win in myriad ways, but without maps, all will be lost. Some games are even more complex than this. For example, the built-in strategy requirements in the *Zork* series (Info-com/Activision) call for accurate mapping plus a specific order of accomplishments. You must use objects you find for unique purposes, in particular locations, and at exact places in the game's storyline. Other strategies are less demanding. In *Marble Madness* (Electronic Arts), all you have to do is learn the fastest way through each section of the surrealistic high-res mazes.

8. PLAYING VARIATIONS ON THE THEME

Many games provide a set of modifiers which allow variations in play such as handicapping, hidden movement, supply, and command control. *Wizardry* doesn't deliver such special features. But in *Archon II*, handicapping gives an inexperienced player more magical energy than an expert opponent, making the match more equal. Practically every political game, board-game adaptation, and strategy and tactics game contains a menu screen offering options for play system modification. These include choices such as whether or not to automatically get hints in a chess program.

WHAT MAKES GAMES FUN?

While we certainly get pleasure from a game's attractive graphics and intriguing sounds, most games remain enjoyable over time mainly because of their clever play systems. They're always there, providing direction and pace to the games you play. If you can identify and pay close attention to a play system, you might be able to figure out what next steps the designer put in and make your plans accordingly. Succeeding at this is called "cracking" a play system. It's also called winning. Winning is not the only goal of playing games, but knowing you've accomplished what the designer had in mind can provide a lot of pleasure. ☐

EDITOR'S NOTE: Each month in *FAMILY COMPUTING's Software Guide*, games are rated in six categories, one of which is *Play System*.

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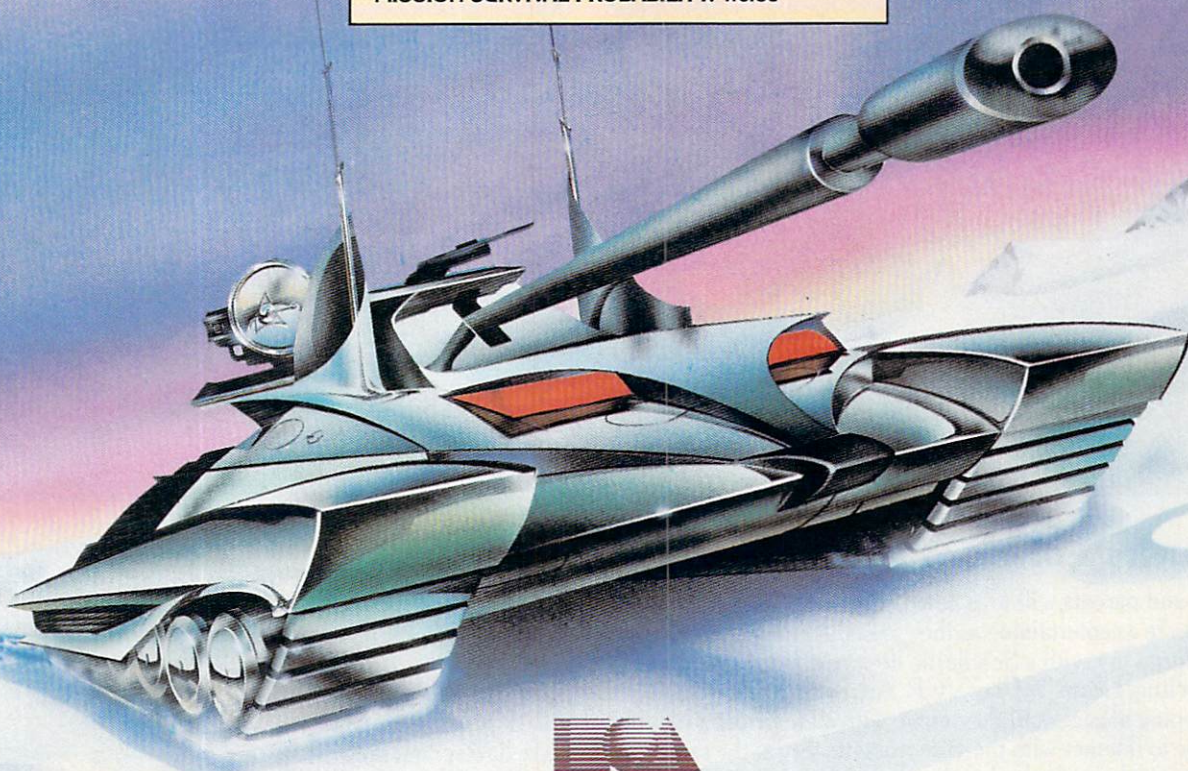
CREW: 1

MISSION SUCCESS PROBABILITY: Slim

MISSION SURVIVAL PROBABILITY: Worse



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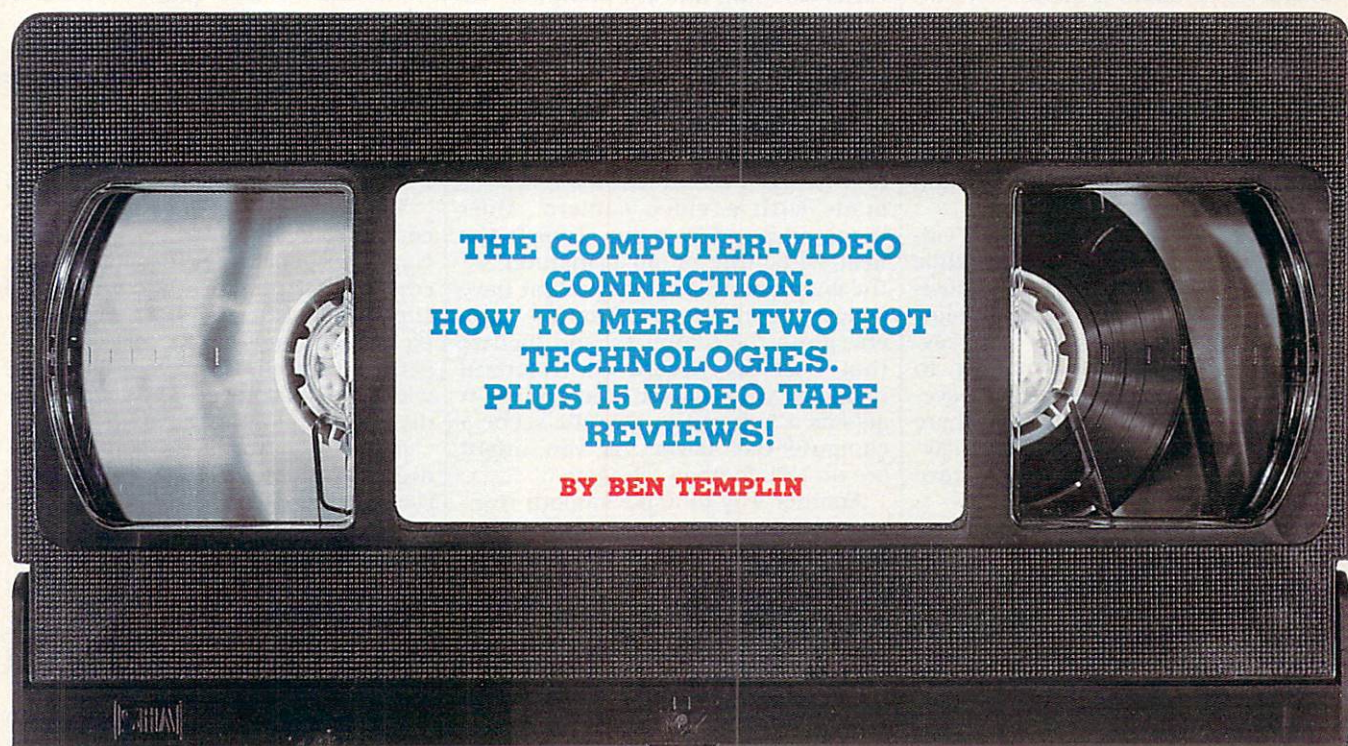


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F A M I L Y

VIDEO

SPECIAL SECTION



Most people who have a computer own a VCR too. Seventy percent of the respondents to a recent FAMILY COMPUTING reader survey said they owned at least one VCR. Eleven percent own two. But how many have joined the two technologies? Probably very few. Perhaps it never occurs to people to connect the two devices. Or perhaps they don't think it's possible. But it's not that hard. You run the video cable from your computer to the VCR, and one from the VCR to your TV or monitor. (See "Making Connections" diagram.)

Once you've got your computer and VCR connected, you've opened up a whole new dimension to both devices. Some applications are practical, like cataloging your video collection and using the VCR as a backup for hard disks. Others are more creative, like recording graphics, making miniature movies, and video letters. Here are some ideas to get you started, plus a few tips on buying and renting videos, plus reviews of selected videotapes.

THE COMPUTER/VCR CONNECTIONS

STRAIGHT RECORDING

The most obvious use for a VCR is to record straight from your computer, just as you would from a television. Say you want to share your computer graphic creations with a friend who doesn't have a computer—but does have a VCR. Record the graphics and send the tape. One of the newer animation programs—*DeluxeVideo* (Electronic Arts) for the Amiga—even offers a menu VCR SAVE function, but you can record from virtually any animation program.

VCRs can also be the great equalizers between incompatible computers. If you have a Commodore Amiga and a friend across the country has an Apple IIe, your best bet is to send your animation on videotape.

"Video" Games. Play a real "video" game by actually recording while you play on the computer. The post-game analysis, complete with slow motion, will improve your strategy. Ask yourself if there is a pattern to the asteroids coming at your spaceship. In the text adventure, was there a clue you missed back in the cavern? Stop the tape, rewind, and have another look.

Data Storage. With the proper equipment, videotape can also be used to hold data in a form readable by the computer, just like a disk drive. A digital-to-analog converter allows you to save data on a VCR, and later read it back into the computer. However, if you tried to play the computer data back on your TV or monitor, you'd only get snow. And videotapes, like computer cassette tapes, don't have random access capability, so it will probably take time to find the file you're looking for.

One digital-to-analog converter is Alpha Micro's VideoTrax ([714] 957-8500), which is designed primarily as a device to back up your hard-disk drive (see "Buyer's Guide to Hard-Disk Drives" in this issue).

MAKING MOVIES

If you use a video camera to make movies, you can use your computer to enhance them. Aspiring Steven Spielbergs might want to digitize

their video footage—or read a video image into the computer, where it can be manipulated with computer software. A digitizer converts a video's analog signal into a digital one that the computer can understand. Most paint programs can then draw over and reshape a video image—whether it comes from a camera, a VCR, or a videodisk.

Most digitizers, which are either cards you plug into the computer, or external boxes, work in black and white only. However, AST Research is developing a color digitizer for the Apple IIgs.

One of the best applications for digitizing is to smooth out the transition between scenes in home movies made with a video camera. Most home videos go from one scene to the next with little or no transition. At the end of one scene, you might have a close-up on a figure. Stop the camera, go to the computer, and digitize that close-up. Record the digitized image on your master tape, so that it acts as a fade-out to give the scene a computer-like flavor, as you might see on NFL football telecasts.

Another way to make smooth transitions is to mix in graphics and animation. Instead of casually shooting the family skiing in the backyard, then cutting to dinner by the fireplace, edit in some animation. For instance, using a program such as *Fantavision* (Broderbund) or *DeluxeVideo*, you might animate a skier who tumbles and snowballs down the slope and into the house with a plop in front of the fireplace. Even a simple stick figure walking across the screen will make for a more interesting video.

Titles and Credits. Such basic embellishments as titles and credits will also add a professional flavor to home videos. Use either a graphics program with character-generating ability or a word processor to make your title screen. Then record that screen before your movie starts. With a word processor, the letters will look pretty small on the screen, but some specialty programs deliver large, easy-to-read letters. Two of these are *Video Titling Program* (Videoware, 19777 W. 12 Mile Rd., Suite 180, Southfield, MI 48076, [313] 626-7208) for IBM PC and compatibles, Apple II,

Commodore 64/128, and Atari XE/XL; and *Leo's Video Titler* (RR1, Box 1610, Templeton, MA 01468, [617] 939-2138) for the Commodore 64/128.

Basic titling may soon give you a taste for more sophisticated effects, such as laying titles on top of video, or putting cartoon balloons with words in movies of your family. Unfortunately, you need professional equipment that will grab a video frame, so you can "paint" special effects or titles over it. Several companies are reportedly working on professional "sync" equipment for the Amiga.

However, you could use a paint program to write words on top of a digitized image, and use that in a movie.

Video Letters. You can use your computer-VCR combo to produce a computer-generated video letter. Just edit your written message with visual clips for a first-class effect. For example, if cooking is your forte, cut together the recipe from your data base with shots of you actually making the dish and explaining each step.

If you have two VCRs, you can produce mini-movies by combining scenes recorded from television with those from a computer game. One VCR holds the television recording, and one holds a blank tape. For an action flick, start with something like the flight screen from the computer program, *F-15 Strike Eagle*. Shoot down a couple of MIGs. This is recorded on the blank tape. Then cut to something from the other VCR, like *Star Trek's* Captain Kirk congratulating you on a successful mission. This is also recorded on the blank tape.

CATALOGING YOUR VIDEOS

If the stick-'em tabs that come with videocassettes don't hold all the information you want, you can record a table of contents at the beginning of the tape. Leave a minute or more of blank space before recording, then use your word processor to make a catalog. Include the name of the show, its running time, counter numbers to show where it begins and ends, and perhaps your own impressions of the program. Then record the word-processing screen on the videotape.

Counter Calculators. If you want to record a half-hour show, but don't

BEN TEMPLIN is a New York City-based freelance writer who has connected his Commodore 128 to a VCR.

WITH MEMBERSHIP

know how much time you have left on a certain videotape, you run the risk of running out of room. Some specialized software converts your VCR counter numbers into the amount of minutes left on a tape, which is a very difficult calculation to make on your own. *VideoFile* (Box 480210, Los Angeles, CA 90048, [213] 655-6795) for the Commodore 64, Apple II, and IBM PC and *Tape Trak* (Thomas Software, P.O. Box 1807, Arlington, TX 76004, [817] 860-5753) for IBM PC and compatibles are both videotape data bases with internal calculators.

VIDEOS ABOUT COMPUTERS

Computers enhance your videos, and video may enhance your appreciation of the computer.

Everything You Always Wanted to Know About Computers . . . But

Were Afraid to Ask (MGM/UA, [212] 408-0600) is written for computer novices. John Wood, who played the reclusive genius in the movie *War Games*, goes through the basics of buying, setting up, and using a home computer. With detachment and understated delivery, Wood gives just enough of the complexity of how a computer works to dispel technical phobias.

Generic Personal Computers (available through The Videotape Catalog, 803 Russel Blvd., Suite 2 Davis, CA 95616, [916] 756-6112) instructs users in the increasingly popular practice of building an IBM PC clone from scratch. The tape includes basics like buying a case and more delicate tasks like soldering chips on a motherboard.

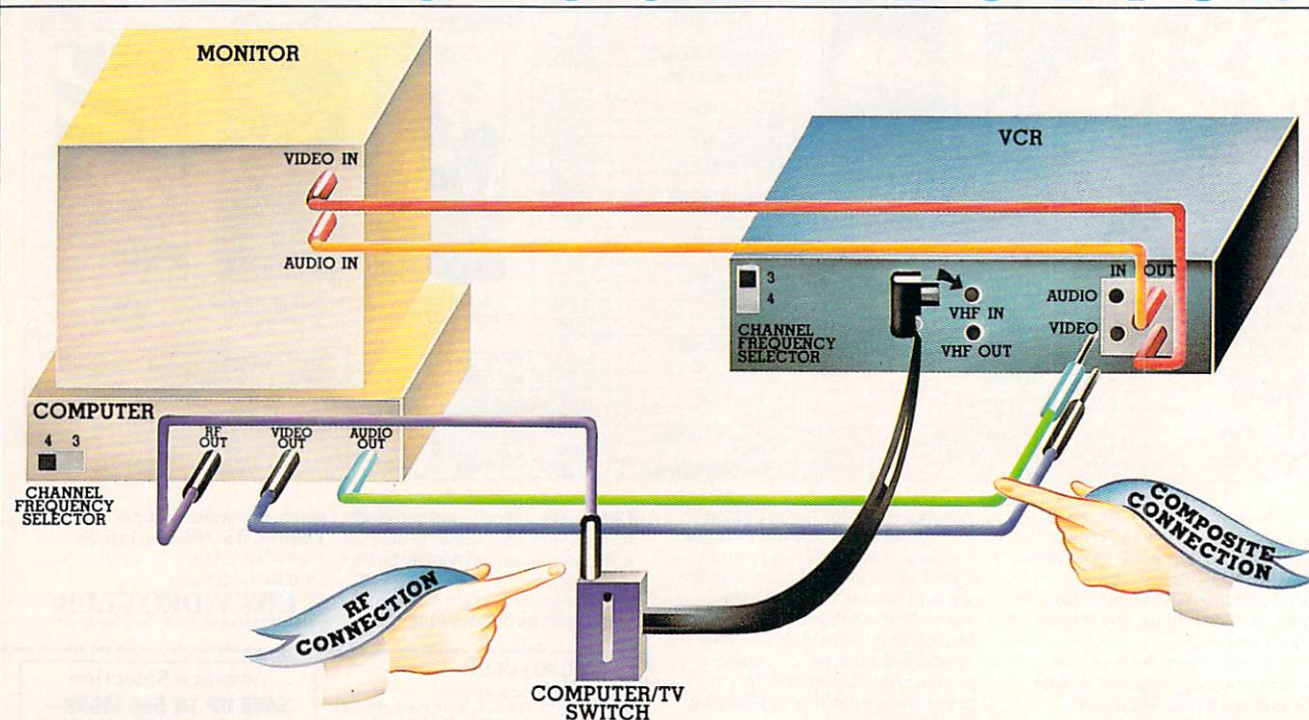
Hackers (available from FABCO), Box 410125, San Francisco, CA

94141, [415] 751-8888) is a documentary on the 1985 computer jock convention organized by Steve Wozniak, co-founder of Apple Computer. The history of hackers and ethical issues like breaking copy protection are explored.

VIDEO FUTURE

In the far future, we'll see a quantum leap in picture quality with digital recording of video. In the past year digital frame storage on VCRs has delivered better slow motion and still-frame effects, but the tape itself is still recorded with an analog signal. Once digital recording becomes a reality, there will be virtually no barriers between computers and video. As the two technologies creep closer together, an electronic meeting of the minds will yield computers with TV-like displays.

MAKING CONNECTIONS



Making the connection between a computer and a VCR is relatively easy. Any computer that delivers composite video or RF output can be routed through a VCR before going to the monitor. Computers with RGB output only will need a converter. There are three ways to make the connection, depending on your computer and your VCR.

METHOD 1: The computer's composite video output delivers the best results. Plug the audio and/or video cables from the computer into the VCR's a/v inputs. On some computers, like the Commodore 64, the video signal is split into two parts—luma for brightness level and chroma for color. A Y-adaptor, available from any electronics store, brings the two together.

And some computers, like the Apple II, have just a video output, no audio.

Now, run a set of cables from the VCR's a/v outputs to the monitor inputs.

METHOD 2: If your VCR has only a/v outputs and no a/v inputs, you can use your computer's RF output. You need a computer/TV switch (which comes with the computer), a 75-ohm-to-300-ohm converter (which comes with the VCR), and one single and one double video cable. (Note: You may have a different type of converter, depending on your antenna.)

First, run the single cable from the computer's RF output to the computer/TV switch. Attach the switch's double-lead wire to the 75-ohm-to-300-ohm converter. Plug the pin end of the converter into the

VCR's VHF input.

Second, run the double cable from the a/v outputs of the VCR to the a/v inputs on your computer monitor. Make sure the computer/TV switch is on "computer."

On many VCRs, all you have to do is plug the computer's TV output into the VCR's TV IN. No other wiring is needed.

METHOD 3: Some computers, mainly IBM PCs and some compatibles, don't have composite output. They deliver a digital RGB (RedGreenBlue) signal. A digital RGB to composite video converter like Communication Specialties' ENC-2 (6090 Jericho Turnpike, Commack, NY 11725; [516] 499-0907) lets you jump from the 9-pin RGB connection to one a VCR can accept.

—BEN TEMPLIN

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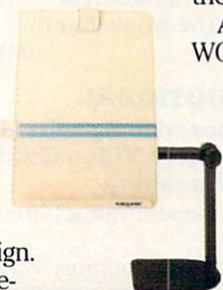
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FAMILY GUIDE TO VIDEO REVIEWS

As VCRs become more and more common in American homes, the videotapes that feed these machines are available in more subjects and in greater quantity than ever before. Our first FAMILY COMPUTING selection of quality videos only touches the surface of this other software explosion, but, just as in our computer software reviews, the selections below offer education, entertainment, and instruction for all the members of your family. The tapes reviewed were all in the VHS format; almost all are also available in Beta as well.

ENTERTAINMENT

Alice in Wonderland

Walt Disney Home Video; \$30; 75 minutes

Rachel (5 years old) and Sarah (1½ years old) watch in open-mouthed amazement as the Mad Hatter tips over a teapot, pouring out both a cup of tea and the cup itself. The timelessness of Disney's animated magic is hard at work. This imaginative adaptation of the Lewis Carroll story respects the original material, while adding its own crazed dimension of visual humor.

My only caveat is that a very fearful child might find some of the characterizations a bit eerie. The Cheshire Cat, for example, though he is a benign presence, might make some children quake in their footed sleepers as he materializes and dematerializes. So if your child is afraid of things that go bump in the night, it might be best not to show this movie right at bedtime.

But for only \$30, *Alice in Wonderland* is an excellent investment and would bring your family many hours of enjoyment. —DEBORAH KOVACS

It's a Wonderful Life

Hal Roach Studios, Inc.; \$40; 130 minutes

A middle-American Christmas fantasy that's among the most heartwarming films of all time. It's about a kind, hopeful man (James Stewart) whose efforts to do good almost ruin him, but whose life is saved by a probationary angel. Originally made in black and white, the film has been "colorized" by computer, which, I feel, makes it all the better—if you

still want to watch the black-and-white version, just turn the color off on your television. —JAMES DELSON

Pinocchio

Walt Disney Home Video; \$30; 87 minutes

This Disney animation is one of the best at meeting the diverse tastes of an entire family. Free of the syrupy sweetness that spoils some of the Disney repertoire for cynical preteens and most adults, it boasts a cast of characters, score, visual style, and underlying concerns that will captivate even the youngest viewer.

The artwork is astonishingly beautiful, particularly in the background paintings. There are dozens of little bits of comedic business, from the delightfully inventive clock mechanisms in Geppetto's crowded workshop to the broad physical comedy of the evil J. Worthington Foulfellow and his bumbling cohort, Gideon.

The temptations Pinocchio encounters in this 1940 movie still ring true today, and youngsters of all ages will find in this film both a pleasantly positive message and absolutely superb entertainment. You'll want to watch it over and over again.

—STEVE MORGENSTERN

Your Show of Shows

Unicorn Video; \$40 each; 60 minutes each (approx.)

You'll find ground-breaking humor in these eight episodes from the classic fifties television shows. Each tape—starring Sid Caesar, Imogene Coca, Carl Reiner, and Howie Morris—offers seven to eight sketches that are consistently amusing and often inspired. Volume Six, the best of the available tapes, features Caesar's manic Viennese professor, Ludwig Von Stranglehold, being interviewed on the art of self-defense. Although somewhat dated, these shows are ideal for the whole family.

—JAMES DELSON

INSTRUCTIONAL

Be Prepared to Speak: The Step-by-Step Video Guide to Public Speaking

Kantola-Skeie Productions; \$80; 27 minutes

Few things strike more terror in usu-

ally confident people than having to give a speech. The tips in *Be Prepared to Speak*, produced with help from the speakers' club, Toastmasters International, will both polish your act and turn those fears into positive energy.

The video's concrete suggestions, such as practicing in front of your family, are mixed with more abstract advice, like changing negative thoughts into positive excitement. We get to see and hear how gestures and varying the pitch and volume of your voice help to make a point. While the price is a bit high to buy, as a rental or library take-out it makes a lot of sense.

—BEN TEMPLIN

Compututor: Using Dbase III for the IBM PC

Chase Scientific Inc.; \$80; 116 minutes

Although it isn't possible to cover thoroughly even half of the features and concepts of *dBase III* in two hours, this tape leads the viewer through a positive, hands-on experience that makes learning more about this most popular relational database program seem accessible and even inviting.

The host (he doesn't seem like an instructor) adopts a casual, conversational tone as he proceeds clearly and logically through the material, pausing from time to time to converse with his "business partner"—a pair of disembodied, white-gloved hands. When not participating in the host's corny humor, the hands point out key locations, handle disks, and type *dBase* commands and data.

Unfortunately, this tape won't work for you if you're using *dBase II* or *dBase III Plus*. But as a whole, *Compututor* makes *dBase III* seem non-threatening and sensible. Other *Compututor* titles include introductions to the Apple II and the IBM PC, as well as tutorials for other software packages, such as Lotus's 1-2-3.

—LANCE PAAVOLA

Exploring Photography: Basic Picture-Taking Techniques

Kodak Video Exchange; \$20; 30 minutes

This video is one of a series that provides excellent, easy-to-apply advice



Alice meets up with a friend in Wonderland.



Your Show of Shows—vintage TV humor for the whole family.

on taking better pictures. Sections deal with types of cameras, flash, camera control, subject control, lighting, and film selection. A high point is viewing and analyzing various photographs in order to learn and apply different techniques. Two flaws to be aware of: Number one, the tape is somewhat outdated. For example, there's no mention of autofocus cameras. The second flaw is the choice of narrator; a photographer or photography educator would have been much more effective than the actor, who has a wooden delivery. Otherwise, the material is clear and well-organized, which makes it helpful for children (ages 10 and up), as well as adults.

—ANNE DOUBILET

Little League's Official How-to-Play Baseball by Video

MasterVision; \$40; 70 minutes

This video is geared to the 8-to-12-

year old beginner, but it could certainly benefit anyone interested in learning baseball's basics. Covers virtually every aspect of the game, starting with equipment and warm-ups, then progressing from fielding and hitting to the particulars of each position, strategy, and team play. While Christian, my 10-year-old Little Leaguer, thought many of the tips were good ("like the one about strengthening your forearms by squeezing a tennis ball"), he thought they should show more variety. "Not everybody has a batting stance like they show," he said.

—SUSAN CECI

The Way to Cook: Poultry

Alfred A. Knopf Inc.; \$30; 60 minutes
Even though I work as a baker in a Manhattan restaurant and have taken professional cooking courses, until now I had read Julia Child in cook-

books, but—amazingly—had never seen her on television. So I was eager to watch this video.

Julia Child's long experience as a performing instructor reveals itself in a multitude of ways. You immediately sense how relaxed she is—she really enjoys this. Her famous sense of humor is more subtle than I'd expected—little chuckles that make the tape fun to watch without distracting. The food is always the focus in gorgeous colors, and the sounds of sizzling almost make you forget the lack of aromas.

The tape is extremely well organized. Each recipe has a number that corresponds to the accompanying recipe booklet. Mrs. Child demonstrates basic preparations, and then gives a number of variations; she crams a lot into one hour. Even to me, a trained cook, some of her techniques were eye-openers in their simplicity and efficiency. I will never clarify butter the same way again.

I missed more extensive discussion of equipment, especially knives. Several of the techniques presented will succeed only with a proper knife in good condition. Still, everyone from the fledgling to the accomplished cook should find this a better investment than any cooking course.

—JUDY NIKOLAI

You and Your Dog

Video Associates*; \$30; 51 minutes
Dr. Michael W. Fox, veterinarian and author of several books, such as the classic *Understanding Your Dog*, brings his solid and intuitive advice to video. In sections that cover everything from health and grooming to the necessity for play and even massaging your dog, Dr. Fox demonstrates how to have a happy relation-

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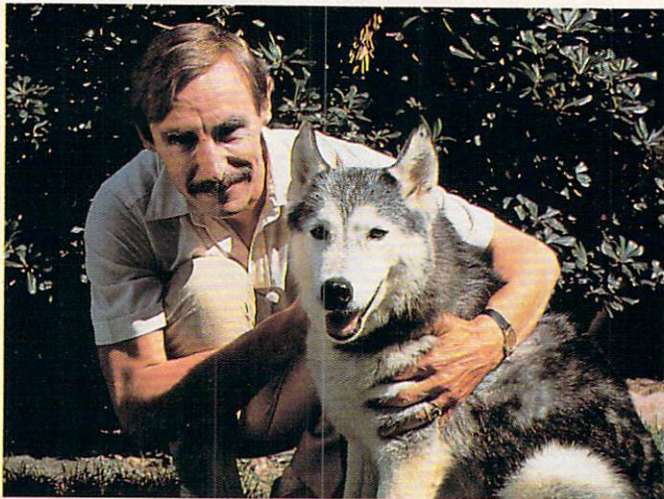
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Walt Disney Home Video

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Be a better dog owner with help from Dr. Michael W. Fox.



James Stewart stars in this classic Christmas fantasy.

ship with your dog. It's too bad he didn't go into as much detail as in his books. But as a rental for a new pet owner, this video can help you with your animal. (And cat lovers, there's one for you, too, titled *You and Your Cat*.) —DAVID HALLERMAN

*VA looking for new distributors at press time.

ESPECIALLY FOR KIDS Add Ventures of the Time Taxi

Spinnaker Video; \$15; 40 minutes
Starring an assortment of Muppet-like characters, this video introduces children (suggested ages 5 to 8) to basic math concepts. It begins with P.J. being prodded by his sister, Cricket, to join the good Professor Mindbender in his time-traveling "Add-Venture" in learning.

Watching one scene along with my 7-year-old niece, Colleen, we witnessed Queen Algebra, a lovable, prehistoric bag lady, as she invents the wheel and we were introduced to measurement. "Let's see, this log is three clubs in length."

With a "Let's go to the Guidebook," the tape pauses four times so the children can try to solve a variety of math problems. But only a child already reading could work independently with the Guidebook. In most cases, it must be viewed with some assistance from a member of the family. This video provides entertainment for kids, which helps motivate them to work through the number problems. —CHARLES SCHEINBERG

My Sesame Street Home Video: Bedtime Stories & Songs

Random House Home Video; \$20; 30 minutes
It came as no surprise that Siena, my

2-year-old "Sesame Street" fanatic, adored this video. With the help of Bert and Ernie, the Cookie Monster, et. al., Big Bird demonstrates various methods of falling asleep, such as cuddling with stuffed animals.

Although I prefer to read to my child at bedtime, going to bed can pose a real problem when I have to leave her with a sitter. By being carefully geared to helping a child wind down, this video seems to be a good solution to that problem.

—LISA KLEINHOLZ

Clifford's Sing-Along Adventure

Karl-Lorimar Home Video; \$15; 30 minutes

By successfully combining live action with video animation techniques, this tape is an excellent vehicle for both entertainment and sing-along participation. Definitely not for the sedentary; Clifford is a lovable character, and the children are real and appealing.

—SANDRA RUCH

Journey to the Magic Jungle

Karl-Lorimar Home Video; \$15; 30 minutes

Children travel along with a puppet boy and a girl on a journey to a fantastic, imaginary jungle. Escorted by Flash—a veritable post-Muppet Tinkerbell—they encounter a range of improbable characters, all in tight spots. Each hapless character begs the trio to solve his or her problem. The boy and girl use their Colorforms shape pieces to "build" solutions to each problem.

The children watching assumed that the enclosed playboard and sheet of 40 Colorforms shapes were integral to the viewing of the tape. They were occasionally frustrated when the pieces on their board did

not match the pieces on screen. Some more specific information on how to use the board while watching the tape would have helped.

That aside, the production values are high. The colorful puppets are well made and well acted. The scripting is good, too. This tape is a good value and should be welcome in any preschooler's videotape library.

—DEBORAH KOVACS

The Velveteen Rabbit

Random House Home Video; \$15; 30 minutes (approx.)

You probably remember the little boy who, by truly loving his velveteen rabbit, enables it to become real after he is finished with it. As an allegory of life after death, and a lesson in the ultimate power of love and caring, this fairy tale is suitable for older children, say ages 6 and up.

As a beautifully produced video, it's entertainment for the whole family, too. The drawings are superb, the original music is haunting, and Meryl Streep's narration is emotionally moving.

—ANNE DOUBILET

VIDEO VOTE

Would you like to see more articles about video in FAMILY COMPUTING? If so, drop a line to Video Editor, FAMILY COMPUTING, 730 Broadway, New York, NY 10003. Tell us what you'd like to see. More about the computer-video connection? Product tests and reviews of cameras and VCRs? More video reviews? Other suggestions? Please include your name, address, and information about the type(s) of video tapes you view most often.

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TELECOMPUTING

THE BAD-WEATHER NETWORK

When Sickness, Storms, or Children Keep You Home, You Can Connect to Your Office via Computer

BY CHARLES H. GAJEWAY

Most people who work in an office don't think of their jobs as hazardous or life-threatening. But for those who drive more than a few miles to work, Mother Nature can be counted on to whip up a few inconvenient or dangerous days each year. Most of us just shrug off snow, ice, and torrential rains, accepting the weather as an unavoidable fact of life. But it doesn't have to be, at least not all of the time.

With more and more people using personal computers at home and at the office, some companies are encouraging employees with substantial commutes to work at home on days when driving is hazardous, a child or spouse is ill, or school or child-care arrangements are unexpectedly interrupted.

A "bad-weather network" of information workers, tied into the office via modem and telephone, is rapidly becoming a useful method of maintaining business productivity.

I have been working at home in bad weather for some time now, usually by bringing diskettes and files home and by taking finished reports back to the office when the roads clear. More recently (at a Merrill Lynch office in Princeton, New Jersey), our office has had good results in getting mainframe tasks programmed so they can run from a home terminal.

THE NETWORK IN A NUTSHELL

The idea of the bad weather network is simple. When it is difficult or impossible to get to the office, employees work on their computer at home—using data brought home on paper, on diskettes, or accessed through a mainframe or personal computer at the office. The final product can be brought into the office or forwarded immediately via modem to an office PC.

Contributing editor CHARLES H. GAJEWAY wrote "Organize Your Collections" in the January 1987 issue.



If necessary, employees can even work together remotely, using modems to send messages and files directly to each others' computers, via an office bulletin-board service or on a time-sharing service such as CompuServe or The Source.

In theory, there should be little difference whether work is performed at home or in the office, as long as adequate modem facilities exist for linking PCs and mainframe computers.

In practice, of course, the office remains the most efficient place to work because all the information, people, and equipment needed to do your work are centralized there. You can forget to bring vital information home, access to mainframe data may be limited, phone lines do go down in bad weather, and home hardware and software limitations or incompatibilities may make complex tasks impossible or unnecessarily time-consuming. But a little planning can help minimize these difficulties and make the network really hum.

HARDWARE

In order to work at home and transfer information to or from the

office, you will need to have a computer, modem, and disk drive (preferably two). A near-letter-quality printer and a hard disk drive are useful, but not critical.

Home equipment that is directly compatible with your office computers (generally IBM or IBM-compatible) is convenient. A floppy-based IBM clone (or even a PCjr) with 640K of RAM and a modem can handle the great majority of office tasks.

However, it's not necessary to have an IBM or compatible computer at home. Data transmitted in ASCII format is generic and can be captured and utilized by any modem-equipped computer with enough memory and disk storage to handle the task at hand. And if you are using a mainframe link, your computer may only have to serve as a terminal, avoiding the issue of compatibility altogether. Atari STs in particular, with built-in communications software, are well-suited for use as terminals.

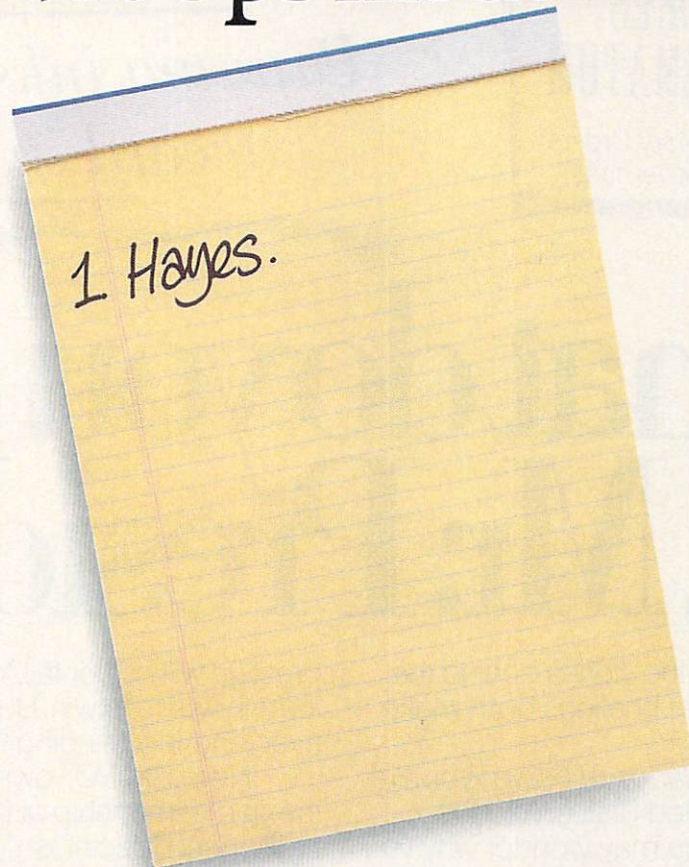
SOFTWARE

Software for your home system is actually more critical to success than the hardware. Programs read and store data in different ways, and it is all too easy to telecommunicate a file from one computer to another and then not be able to use it because of incompatible file formats. Careful selection of software for working at home can reduce or eliminate such problems.

Programs that can directly create and use standard ASCII data files allow much easier file transfer than those that require special file formats. For example, Release 2.01 of Lotus's 1-2-3 can directly load telecommunicated ASCII data and format it into a usable spreadsheet.

Another common file format that can be easily telecommunicated is the Data Interchange Format or "DIF" file originally developed by Software Arts. (DIF files are ASCII files with data arranged in a specific

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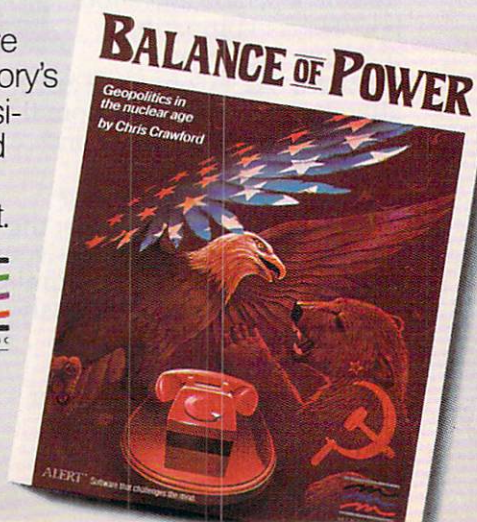
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format.) While DIF files can't transfer worksheet formulas, they are a convenient way to transfer large chunks of numeric data between dissimilar programs like *AppleWorks* (Apple) and Lotus's *1-2-3* (IBM).

Many programs have a built-in facility for converting files from other widely used programs. *AppleWorks* can use *VisiCalc* and *QuickFile* files directly. Lotus's *1-2-3* has a utility that can convert *VisiCalc* or *dBase* files into *1-2-3* format and translate *1-2-3*, *Symphony*, and *Jazz* files. *Microsoft Excel* (for Macintosh) can use and create *1-2-3* files directly.

Converting files tends to be a lengthy and somewhat error-prone process, but it's a lot better than not being able to use the file at all.

MAINFRAME COMMUNICATIONS

If you routinely deal with information downloaded from a mainframe computer, it can be just as easy to work at home as in your office. Find out if you can access your company's mainframe via modem, what kind of terminal emulation (VT100, VT52, etc.) is required, and the required parameters (e.g., transmission rate, data bits, stop bits, duplex settings, transfer protocol, etc.).

Your communications software must be able to emulate a certain terminal type, a carryover from the days of dumb terminals. High-powered software, such as *ASCII Express* (for Apple and IBM) and *Crosstalk* (for IBM) can emulate several terminal types.

Find out if there are times when remote access is shut down, so you won't get locked out at a bad time. Practice getting on and off the system and transferring data files back and forth so that you will be able to do it easily when it really counts.

REMOTE CONTROL

You can also access your office computer from home, if the office computer uses communications software that has a REMOTE function (*Crosstalk*, *DeskMate*, and *ASCII Express* do). All you have to do is leave your office computer turned on, in REMOTE mode. Then, you can call from home with a wide variety of communications software and read files from the floppy- or hard-disk drive at the office.

Once you think you have the right setup, practice transferring information between your office and home.

And get in the habit of leaving your office PC turned on with the communications software running—or at least make sure several people know how to turn it on.


Finally, keep a list of phone numbers. You should have the numbers for several modem-equipped PCs at your office, numbers for the mainframe, numbers of other employees with PCs, and numbers for time-sharing services with multiple-user communications like CompuServe or The Source. That way, you will have alternative sources of information and destinations for the finished products. The best telecommunications network around is useless to you if you can't access it.

PLAN ACTIVITIES

Many potential difficulties of a bad-weather network, especially compatibility problems, can be eliminated by planning what you should do at home and how you will do it before the first storm (or other crisis) blows up. Convert frequently used worksheet files and test them in advance to make sure they will work; save files in ASCII format on your office PC so they are ready to telecommunicate; identify those tasks that you cannot do on your home system in advance so that you won't waste time trying when the snow flies.

Since most people have several active tasks at any given time, plan to do alternative projects at home. Keep a "to-do" file in your briefcase stocked with a number of small tasks that your home system can handle readily. Spending a day drafting a report or catching up on correspondence can be every bit as productive as completing a complex forecasting exercise.

NETWORK CHATTER

A key element of a successful network is having enough active links to support the task at hand. Talk to other PC users, especially if you have contact with them in your job. Tell them what's going on and how to do it; get them interested. Practice hooking up via modem, both at the office and at home. Brainstorm ideas on how to make working at a remote location efficient and effective. And talk to your boss about the network and its potential benefits. After all, everybody has days when they need to be at home, even if the weather isn't bad. 

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APPLE

BY CHARLES H. GAJEWAY

Apple has announced that it is collaborating with *National Geographic* and Lucasfilm to "explore the effective use of optical technology in education," specifically with regard to videodisks and compact disks. Considering the information density of these media, the graphics capability of the new IIGs, and the presentation wizardry of Apple's collaborators, great things are to be expected.

II Plus Memory Expansion?

Chip Younkin of Arlington, Texas, asks whether it makes sense to expand memory and use a RAM disk to speed up his II Plus.

A RAM disk is a chunk of computer memory that can act like a very fast disk drive, with the proper software. RAM disks speed up disk-intensive programs enormously, since the whole program is loaded in memory.

Frankly, though, I don't favor using expansion memory as a disk drive. RAM disks are not a universal cure. They will not accelerate a program that rarely accesses the disk. And many copy-protected programs refuse to cooperate with RAM disks.

I greatly prefer using a hard disk to speed up disk operation. It's not quite as fast as a RAM disk, but it's easier, safer, and more versatile. And a hard-disk unit like the Sider (First Class Peripherals; [800] 538-1307; \$500-\$800) or one of the ProApp series (ProApp Inc.; [714] 855-9088; \$800-\$1,000) is only a few dollars more than a 1 megabyte expansion card. If you decide on RAM expansion, check compatibility of expansion boards, since some that work with the IIe don't work with the II Plus.

Jazz Note. A small incompatibility with Mac System version 3.2 makes it impossible to open more than one Communications window in Lotus's Jazz. Lotus has a fix for this problem, and it is available free on CompuServe (GO LOTUS) or by calling the Jazz help number.

CHARLES H. GAJEWAY can be reached on The Source (ID: BBQ794).

ATARI

BY JOHN J. ANDERSON

About 5,000 people attended the Northern California Atari Expo last fall in San Jose, including yours truly. Show highlights included the first sales of the Magic Sac Plus (Data Pacific; [303] 733-8158; \$149.95), the Macintosh emulator cartridge for the Atari ST. It allows you to transfer software from Macintosh to an ST via the RS-232C port.

Multi-ST Games. Xanth ([206] 624-9292) showed an ST version of *Mazewars*, a public-domain program (check your local bulletin board) which permits up to 15 STs to be connected via MIDI port. *Maze* is a 3-D first-person-perspective game in which you wander around in a maze trying to zap other players.

Speaking of multi-ST games, FTL ([619] 453-5711) showed a good-looking dogfight game for one computer, or for two players with two STs connected by MIDI cables. The graphics are similar to flight-simulation games from Microprose, and the play action is so good that it was almost impossible to get near the machines all weekend.

Haba showed a few products that have promise. In particular, the *Habaview* data-base manager impressed me—it makes good use of the GEM user interface to create customized data bases.

Hippopotamus Software, Inc. ([408] 395-3190) was selling its Hippo Sound Digitizer (\$140). This unique product allows real-time input sound to be stored digitally, then played back from RAM.

\$50 \$Big \$SOnes. Atari Corp., previously a private company owned by Jack Tramiel and other investors, is now a public company. Last November, the company offered 4.5 million shares at an opening price of \$11.50, and thus raised \$50 million. Thirty-six million dollars will be paid to Warner Communications, Inc.,

QUESTIONS? COMMENTS?

Send both to FAMILY COMPUTING, Machine Specifics, 730 Broadway, New York, NY 10003

from whom Tramiel bought Atari in 1984. Atari stock is traded on the American Stock Exchange. The Tramiel family owns 53 percent of the stock.

JOHN J. ANDERSON can be reached on CompuServe (ID: 76703.654).

COMMODORE

BY SHAY ADDAMS

Icons and windows and a colorful desktop—these may be everyday sights on the Amiga, but seeing them on a 64 makes me feel like I'm in the Twilight Zone. If nothing else, GEOS makes a great utility for handling DOS chores, such as copying and deleting files. But GEOS has severe limitations.

A graphics-oriented operating system, GEOS takes up a lot of RAM and leaves only about 30K for programs inside your C64. That's why *geoWrite* lacks such elementary features as Search and Replace, and why document size is restricted to three pages. Another oversight is *geoWrite*'s inability to load and read sequential files created by other word processors or saved while accessing QuantumLink. To create a bigger file, part of it must be kept on disk, which must be loaded into RAM when it's needed. GEOS may ultimately prove more practical on the 128, which has access to the extra memory.

The 128 version of GEOS does not support 80-column mode, but comes with an application switcher so you can keep two programs in memory simultaneously. It uses the full 128 keyboard and the 1571's two-sided disk capability.

Students: Take Note! Students and authors will find two new programs handy: Broderbund has an outline processor called *Thinking Cap* (\$49.95) for the 64/128. For the 128, Activision's *Term Paper Writer* (\$49.95) is really four programs: *Notetaker*, *Outliner*, *Writer*, and *Footnoter and Bibliography Compiler*.

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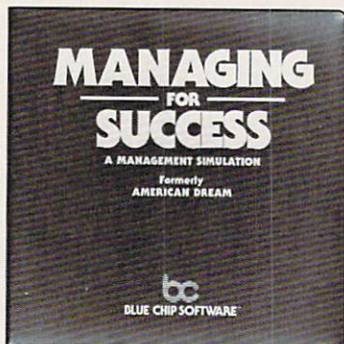
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MACHINE SPECIFICS

Talking Word Processor (\$69.95) is a novel Amiga word processor that reads your copy as you write it or after it's done (Finally Software, 4000 MacArthur Blvd., Suite 3000, Newport Beach, CA 92663; [714] 854-4434).

SHAY ADDAMS can be reached on *CompuServe* (ID: 72267.601) or *QuantumLink* (ID: JB CHALMER).



BY HENRY F. BEECHHOLD

Take heart. Those of you with the less glamorous of the IBM PCs—the older ones that lack the jazz and speed of the latest versions—needn't chuck your old reliables. One of the best things about IBM personal computers is their adaptability and expandability. Their openness allows for a high degree of personalization, giving new meaning to the term "personal computer."

Many computer users shy away from tinkering with their mystery box. As a result, they end up making do with the computer pretty much as it came out of the carton. But, if you are mechanically minded in the least, you should be able to enhance your computer. If you don't care to tinker, you can take it to an electronics shop and have it upgraded for much less than you'd pay to buy a new computer.

Super Disk Drives. You can, for example, replace your present disk-drive controller board with a Drivemaster board, allowing you to use up to four half-height 5.25-inch and/or 3.5-inch floppy-disk drives. Thus, you can use the 1.2-megabyte floppy drive that the IBM PC/AT and PC/XT 286 use. And, if you install 3.5-inch microfloppies, you'll be able to exchange data with the IBM PC Convertible, IBM's laptop (Computer Peripherals Inc.; [805] 499-5751; \$245).

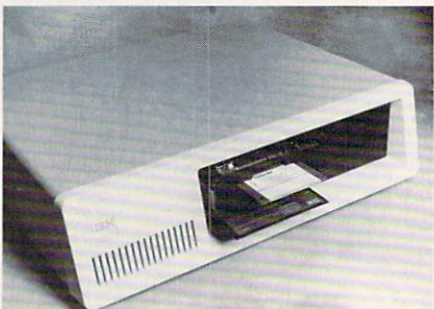
To use a 1.2-megabyte disk drive, you'll need DOS 3.0 or higher. To use a 3.5-inch drive, you'll need DOS 3.2 or higher. Either DOS will cost about \$80.

New half-height 5.25-inch internal disk drives, which you need to get 1.2 megabytes of storage, will cost from \$150 to \$200. Depending on the structure of your system, you may also need a new frame to hold the half-height drive. An external 3.5-inch drive will cost from \$350

to \$400.

To swap drive controller boards, open the computer (with power off!), remove the screw, disconnect the data cable, pull out the old board, insert the new one, reconnect the data cable, and replace the screw.

The new drives can be mounted inboard or outboard. For inboard change, you need to take out a couple of screws and unplug two cables to remove the old drive, and then reverse the procedure for the replacement. The trickiest part will be getting the new drive to sit with proper



Toshiba sells a 3.5-inch disk drive (\$150) that fits into an IBM PC.

support inside the old casing. You may need aluminum spacers for this project.

An outboard setup is preferable with 3.5-inch drives. You can mount the new drive in an enclosure that has its own power supply. The disk-drive supplier will provide powered enclosures as well as the longer data cable required.

Drivemaster needs no special software configuration; it's got onboard smarts to worry about such matters. In future columns, I'll continue with suggestions for building an ever-better PC and tell you about noteworthy new products. Meanwhile, here's a teaser about my favorite word processor. Wrong! It's not *WordPerfect*!

A Super Word Processor (and Cheap too!) For a long time I've been using *WatchWord*, what I consider the cat's pajamas in word processors. Although formerly available only for the Zenith Z100, a non-IBM compatible MS-DOS machine, *WatchWord* has just come out in a PC version. It would be a wonder at thrice the price, but at \$99.95, it's at least two wonders. It's easy, convenient, and powerful—all that good stuff. Send \$2 to S&K Technology Inc. (4610 Spotted Oak Woods, San Antonio, TX 78249; [512] 492-3384) for a demo disk. Another \$2 will get you a demo of *Resident Speller*, an

ever-present, beep-as-you-misspell proofreader. The package'll knock your Reeboks off.

HENRY F. BEECHOLD, professor of English & Linguistics at Trenton State College, is author of *The Brady Guide to Microcomputer Troubleshooting & Maintenance* (Simon & Schuster, \$17.95).

MS-DOS

BY STEVE MORGENSTERN

You don't have to be a legal eagle to be interested in a recent court battle between Broderbund Software Inc. and Pixellite Computer Products Inc. on one side and Unison World Inc. on the other.

Broderbund and Pixellite, developers of the extraordinarily popular program *The Print Shop*, claimed that Unison had infringed on their copyright with its banner- and postermaking program, *Printmaster*.

According to Broderbund, the Unison software copies the menus, displays, and general structure and organization of *The Print Shop*.

A U.S. District Court ruled in favor of Broderbund, affirming that a developer can copyright the "overall appearance, structure, and sequence" of software.

Unison reportedly plans to appeal, and there's no telling how long it all may drag on.

The significant point for MS-DOS software users, though, is that the case puts a damper on the activities of publishers who produce copies of successful programs, usually offering them at sharply lower prices than the original. This practice has grown quite common; there are any number of software clones emulating Lotus's *1-2-3*, *Crosstalk*, and other industry leaders.

Shanghai. My recommended game this month is *Shanghai* from Activision. The game uses the familiar set of 144 tiles from Mah-Jongg in a new and different way. The tiles appear on-screen in a five-high stacked formation. Your goal is to find matched pairs and remove them from the playfield. However, you can only take tiles that have no other tiles on top of them and are at the right or left edge of their stack level.

The game can be played solitaire, cooperatively, or in head-to-head competition with timed turns for each player. Enough strategy is re-

quired to make it addictive, yet the game's basic simplicity makes it instantly accessible.

STEVE MORGENSTERN can be reached on CompuServe (ID: 72545.606).

TANDY

BY STEVE MILLER

The Color Computer 3 makes a real leap forward over previous CoCos with windows, better graphics (640 x 192), and more memory (up to 512K). For those of you who own earlier versions of the CoCo and want to upgrade, you can be assured that most software and attachments will work on the CoCo 3 without any trouble, but there are some exceptions.



The 128K Color Computer 3 displays 80-column text in color on an RGB monitor.

For instance, the Multi-Pak Interface will not work on the CoCo 3 without a modification. The modification, which must be done by Radio Shack technicians, will cost about \$6, plus labor.

Some software written by third-party vendors may not run on the CoCo 3 if it does not follow Radio Shack's guidelines closely. *VIP Writer* is one major piece of software that will not work on the new machine.

If you purchase the new CM-8 RGB Analog Color Monitor, which was designed to work especially with the CoCo 3, you might be shocked to see that some of your old software may only run in black and white. There is a complicated technical reason for this, but the bottom line is that nothing can be done. If you must have color for those packages, reattach your color television.

Software By Mail. T & D Subscription Software (P.O. Box 256-C, Holland, MI 49423; [616] 396-7577) has been around for about five years, providing CoCo software for its

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MACHINE SPECIFICS

subscribers on a monthly basis. The programs are mostly games and utilities, but some home-finance packages are included. Each monthly "issue" contains at least 10 programs, which are available either on disk or cassette.

The quality of the issue I looked at ran from excellent to so-so. But, at about 60 cents per program, the service is a potential bargain. It costs \$70 for 12 issues; back issues with more than 500 programs are also available.

Quote of the Month: "Anything that is significantly advanced cannot be distinguished from magic. The CoCo 3 is magic."—Mark Siegel, software products manager at Tandy and one of the key developers of the CoCo 3.

STEVE MILLER, former computer columnist for UPI, is a freelance writer and computer consultant.

ORPHANS

BY PATRICK SPERA

Like others, I spend a great deal of time scanning computer magazines for articles about my favorite machines. For the most part, this is a wasted labor. Only a couple of magazines, like FAMILY COMPUTING and Computer Shopper, still support orphans.

So where would a person go to find a magazine or newsletter for his or her computer? Am I going to tell you? You bet your RETURN key I will.

Adam Advice. NIAD Newsletter (P.O. Box 1317, Lisle, IL 60532; [312] 961-3529) provides a monthly newsletter for its members. The \$18 (\$24 for first class and for Canadian mail) annual fee will get NIAD members the newsletter, discount prices on hardware and software, and access to the NIAD Public Domain software exchange.

Digital Express, Inc. (Route 1, Box 29-G, Oak Hill, WV 25901) produces a monthly newsletter called *Nibbles & Bits*. A six-month subscription is \$12 (\$18 for 12 months). Subscribers get discounts on products carried by Digital Express. Back issues cost \$3.50.

TI 99'er News. Micropendium (P.O. Box 1343, Round Rock, TX 78680; [512] 255-1512) is a broad spectrum magazine for the TI 99/4A. The 12-issue price is \$17 (\$20.50 for

first-class mail and in Canada and Mexico). *The Smart Programmer* (Bytemaster Computer Services, 171 Mustang St., Sulphur, LA 70663; [318] 527-0035) is a newsletter with a programming slant. The cost is \$18 (first class mail in the U.S. and Canada) for 12 issues. A complete set of Super 99 back issues can be had for \$18.

Genial TRAVeLER Diskazine (Genial Computerware, 835 Green Valley Drive, Philadelphia, PA 19128; [215] 483-1379) is a "flippy" disk (a floppy that is actually two single-sided, single-density disks) with articles and programs. Gee, no more listings to type in! It is \$36 for a six-issue subscription. Unless you want your subscription to begin with the current issue, you will start with Volume 1, Issue 1. This will entitle you to the two bonus disks given to "charter subscribers."

Timex Tabloids. SyncWare News (Thomas D. Woods, P.O. Box 64, Jefferson, NH 03583; [603] 586-7734) provides six newsletters for Timex Sinclair users. *Quantum Levels* (\$18.95/6 issues) is for QL users. *SyncWare News* (\$16.95 for 6 issues) is for TS 1000, 1500, and 2068 users.

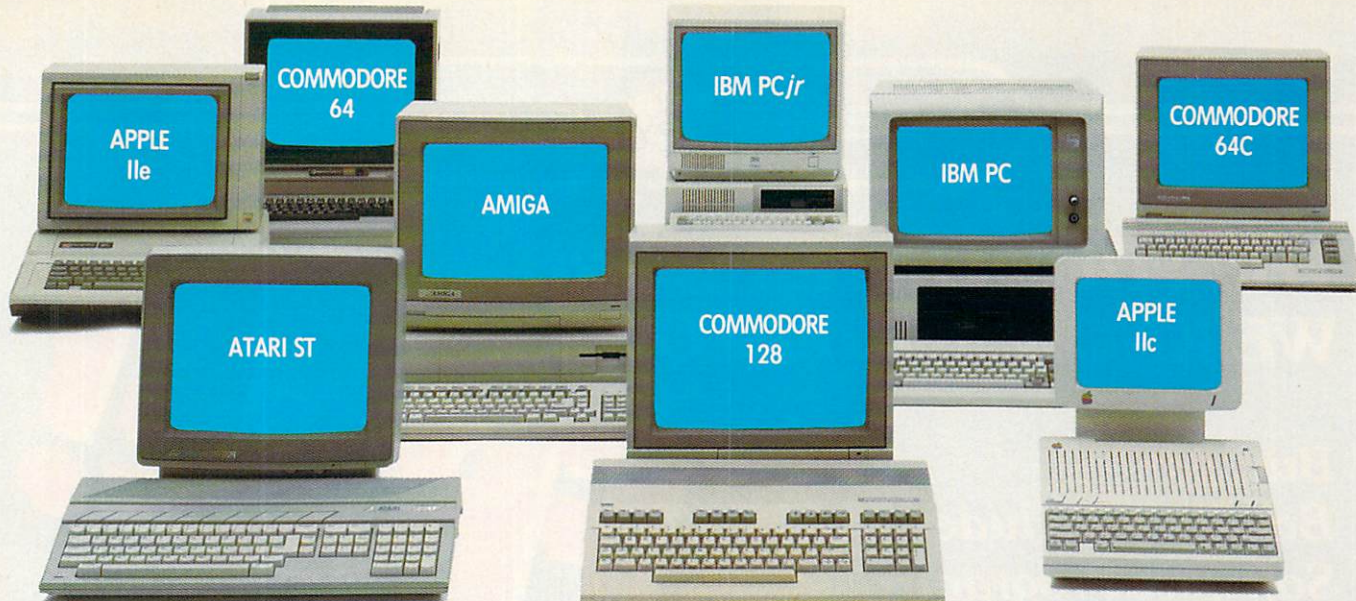
Time Designs Magazine (29722 Hult Rd., Colton, OR 97017; [503] 824-2658) is a bimonthly magazine for TS computers. The price is \$15 for one year. *Time Designs* recently merged with SUM Magazine.

OSI, CP/M, Eagle. PEEK[65] (P.O. Box 586, Pacifica, CA 94044; [415] 359-5708) is a monthly magazine for the OSI series of computers. The rate is \$22 for 12 issues.

The Convocation (Leslie Lieurance, Editor, 101 Parnassus, #1, San Francisco, CA 94117; [415] 661-4362) is a quarterly newsletter produced by the Screaming Eagles User Group (David Yaros, president, 615 Executive Building, 35 E. Seventh St., Cincinnati, OH 45202). It is free to members and \$6.50 for nonmembers. It covers Eagle computers from the EII to the Eagle 1600 PC.

CodeWorks (3838 South Warner St., Tacoma, WA 98409; [206] 475-2219) is a bimonthly magazine for users of Microsoft BASIC. It provides generic listings of programs that the reader can edit to run on a particular machine. The cost is \$24.95 for six issues. **ff**

PATRICK SPERA can be reached on CompuServe (ID: 76703.4350).



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CIRCLE READER SERVICE 7

The ABCs of Computer Care And Maintenance

SOME TIPS ON
SETUP, SMART USE,
SHINE-UP, SAFETY,
AND SERVICE

BY LINDA WILLIAMS



An overzealous IBM PC owner who had heard and read too many stories about disks destroyed with no backups in existence, hours of work lost in a blackout, and keyboards ruined with spilled drinks, vowed to head off as many potential problems as possible through smart use and care.

So when his keyboard started getting a little grungy, he gave it a cleaning; he removed all of the keys and shined up the keyboard's components with a strong, all-purpose spray cleaner. When he put it back together again and gave the sparkling keyboard a test peck, his heart dropped to his feet. The keys stuck. Unable to unstick them, he was forced to take the computer into a third-party repair shop and shelled out \$65 in parts and repairs.

Stories like this bring smiles to the faces of those who only fix what's broken and turn their noses up at computer-care products (until disaster strikes). The fact is, you can't have complete faith in any electronic component, including your computer, and there are precautions you can take and rules you can follow to minimize the risk of malfunction. Keeping true to human nature, few of us will ever follow all of these suggestions. But even heeding a few of them is bound to pay off.

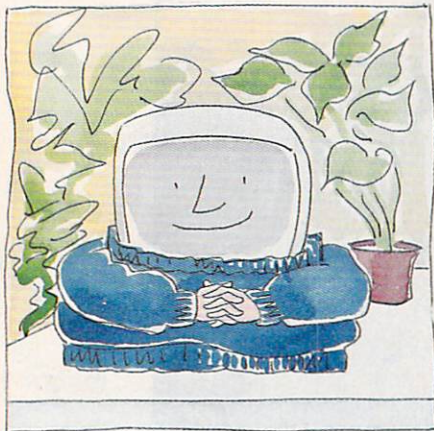
LINDA WILLIAMS, a reporter/researcher for Time magazine, frequently writes about computers. She wrote "Help Students and Senior Citizens Become Computer Pals" in the May 1986 issue of FAMILY COMPUTING.

PHOTOGRAPH BY JANET BELLER

ARRANGE AN APPROPRIATE HOME FOR YOUR COMPUTER

It doesn't matter how good your computer system is or how much you've spent on protective devices; if you don't put it in the right setting, your computer may give you trouble. A few essentials to remember:

First, think comfort for both you and your computer. (The industry buzzword is ergonomics; what it boils down to is the optimal working environment for humans and machines.) Your computer needs a stable surface to sit on and shouldn't be moved too often. When you *do* have to move your machine or a peripheral a considerable distance, be sure to pack it in its original box—so make sure you hold onto all packaging.



Also, be aware of the room temperature. If it's extremely hot, the microchips inside could overheat and burn out, causing malfunctions. Sunlight through a window intensifies heat, so keep your system away from the sun's path. Set it up away from radiators and other heat sources, too.

Bill Fahy, who runs a consulting firm from his basement in Milwaukee, Wisconsin, shares some sensible advice on temperature maintenance for computer use. "I figure when I'm comfortable, the computer must be too. If it's too cold, I can't put a sweater on the machine," he said. "I have the area warm enough in the winter, and don't keep the computer near a window."

Erik Sandberg-Diment, a well-known syndicated columnist who writes about personal computers, has similar empathy for his system. Because "computers really should not be operated in temperatures above 85 degrees Fahrenheit, during the summer I tend to go fishing a lot by day and work at night," he wrote.

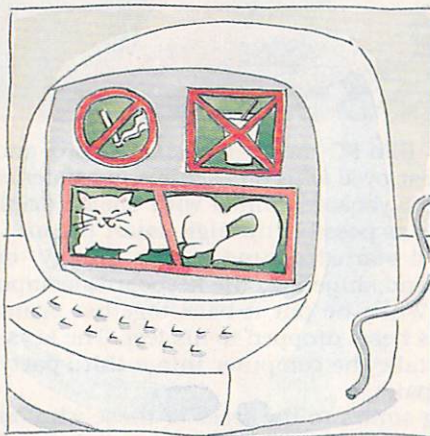
The humidity level is ideal when it falls between 50 and 70 percent. Be-

low that level, dry air promotes static buildup on objects, so you may encounter static problems, which can scramble data or even cause short circuits. And you'll risk rusting the metallic parts of your machine above that level. You may consider buying a humidifier or dehumidifier if the typical levels in your region are out of these boundaries. To control winter static (the result of dry heat), you might invest in an antistatic spray for the carpet or your seat cover. Antistatic mats are also available.

Magnetic fields can alter data on disks—after all, it's magnetism that puts the data there in the first place—so to play it safe, store disks and your disk box away from any magnetic source, including telephones and televisions. You also shouldn't leave disks on top of your monitor; when turned on, the monitor generates an electromagnetic field and can scramble the data on your disks. Other potential sources of magnetic fields are electric motors such as those that power vacuums and pencil sharpeners.

BE A SMART USER

The habits that start to form from the first time you turn on your computer help determine your chances for computer disaster down the road. If you're careless with your hardware and software now, you'll pay (literally) later. Develop a smart daily routine—or kick a careless one—so you won't have to cross your fingers every time you access a file. Here are a few guidelines to set you on the track to smart use:



- Before you start, read the manual carefully. While you don't have to take the approach of one Kaypro owner who wouldn't touch the machine until he'd spent three days reading the manual cover to cover, you'll find kernels of wisdom by skimming through your manual and using it as a refer-

ence guide. If you have any trouble or worries in setting up the system, by all means call your computer dealer or manufacturer.

- The surest path to a happy, hassle-free computing life is through strict rules of use and sensible working habits. For instance, it's a good idea to forbid smoke, food, drinks, and pets in your computer area. Smoke adds particles to the air that may act as a menace inside your computer or disk drive; spilled food and drinks can damage your keyboard or floppy disks; and pet fur can sneak into your keyboard. For that matter, heavy use of liquid chemicals such as nail-polish remover, ammonia, and glue near the computer may be harmful. Over time, their fumes will react with your disks' magnetic surfaces—and may cause harm.

- Be sure your computer is off before you plug it in. When you insert a plug into an outlet, electricity actually jumps to make the connection. If the machine is turned on when you plug it in, you'll see a spark—which is actually a surge of current. Although it's unlikely, the power surge may short out your system.

- Don't turn the machine on and off too often. If you need to load up a new program while you're already working, try the key combination known as a "warm boot." It will extend your power supply's life and the life of the microchips, too. You may want to turn down the monitor's brightness or even turn the monitor off when you leave the machine turned on for a couple of hours; if you leave an image on the screen for too long, the image could become "etched in."

- If your computer system is plugged into a power strip, keep the strip clear of areas where your feet could accidentally turn it off. Also, don't use an outlet that is activated by a wall switch. Wilmer Ames, a New York City magazine editor, knows this all too well. "An out-of-town guest was staying in my apartment one night, and I was at my Wang PC writing an important freelance article," he recalls bitterly.

"I had four to five pages done but not stored, and my friend, as a joke, flipped the switch, thinking it would turn off the light," he says. Instead, the screen went dark.

"I was so devastated, I couldn't even get mad," Wilmer says. "I just sat there, turned the computer back on, and tried to remember what I had written."

- If you use a printer, advance the paper by depressing the line-feed or

paper-feed button. Don't get in the habit of turning the paper with the paper advance knob—unless the printer is turned off. Turning the knob while the printer is on works against the motor and will wear it down faster.

- Make backups of your disks often, particularly when you're working on something long and detailed, and keep the backup disks in a safe place. Most computer horror stories come from people who have lost data for which they didn't make backups. Here's one more story:

One afternoon, employees of a New York City science magazine saw a photocopy of a torn-up floppy disk everywhere they turned. Attached was a note that said: "If you think this looks like a torn-up computer disk, it is. I would suggest that if you don't want this to happen to you, make backups frequently!" The note recounted writer Michael Lemonick's nightmare:

"I was using my PC, working on a cover story, and I was really struggling with it. It was so hard to write, I hadn't thought about saving to another disk for a while," Mike recalls. "Then I got an on-screen message, saying: 'I can't read your disk.'"

"I knew I could never remember what I had done, so I tried another disk drive. I got the same message," he says. "So then I tried another computer. When I asked for my directory, it said there were no files in it. All I could do was reconstruct my work, and that took about five hours."

"I was so mad, I took out the disk, ripped it apart into shreds, and headed for the Xerox machine," Mike recalls. After that emotional outlet, Mike still had to rewrite the piece.

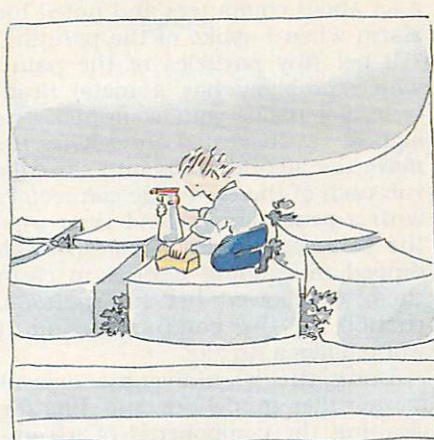
- At the risk of repeating what you've heard a thousand times before, I'll repeat: **HANDLE DISKS WITH CARE!** Never touch the surface of the actual disk with your fingers, since they'll leave an oily residue that obstructs the data stored and can dirty your disk-drive heads. To be safe, make a habit out of holding disks by their labels. Never write on a disk label with anything sharper than a felt-tip pen, unless you haven't affixed the label to the disk yet. Be sure to always store your disks in their protective paper sleeves. And you would never paper clip or staple anything to a disk, right?

CLEAN IT

Like most household appliances, your computer will need routine cleaning to help it run well. Dust is

arguably the worst culprit, if not the most common one. Your best defenses are dust covers, particularly for your monitor, keyboard, and printer. There may even be instances when covering your computer won't save it from menacing dust particles, particularly paint and sawdust. My advice to those who are about to embark on a home-improvement project: Take your computer out of the area. I learned the hard way.

A few months after buying my own computer system, I decided to paint and scrape the walls of my apartment. I carefully draped a sheet over my beloved system. A few days later, when I turned on the power to work on a writing assignment, the computer wouldn't give me that reassuring "bleep." I removed all of the add-on cards, detached the other components, and lugged the machine on



the subway to the nearest authorized dealer, who sold me a new, \$90 power supply. Back home, the computer still wouldn't work.

With the time until deadline ticking away, I called a friend who knows

BE SURE WITH INSURANCE



No matter how carefully you care for and maintain your computer, accidents and breakdowns do occur. You'll be better prepared for the inevitable if you have sent in the warranty card and saved the original box and foam or plastic padding. Since you won't get advance warning of a robbery, electrical fire, or a flood, you should consider an extended warranty, a service contract, or insurance.

Warranties. Warranties for electrical components generally last for 90 days, the period in which the majority of inherent problems surface. Look carefully at the type of warranty that comes with your machine. A full warranty, under the Federal Magnuson-Moss Warranty Act, must provide free repair or replacement within a reasonable time frame. Under a limited warranty, you may be required to pay for some parts, labor, and/or handling.

Extended Warranties. For your own peace of mind, you may consider an extended warranty or service contract—at a cost of about 5 to 15 percent of the component covered. Each manufacturer has a different warranty program, varying in cost, length of time, and particulars of service. Some offer on-site repair, while others require you to mail or carry the machine in. If you're often under time pressure, be sure your contract includes loaner machines and components for the repair period.

Service Contracts. A form of "extended warranty" service contracts are for those who need fast service. In addition to guaranteeing that your computer will be fixed without any extra charges, they often guarantee priority service, minimizing your down time. You should consider one specifically for the electromechanical components, particularly the printer and disk drives. Service contracts—which are usually available from manufacturers and dealers—carry a yearly cost of about 10 percent of the component's cost for carry-in service, and 15 percent for on-site service. You aren't likely to need service for modems and circuit boards, which have no moving parts so are less frequently subject to failure.

Insurance. Some home owners' policies will cover your computer system. Ask your insurance agent if your policy includes computer coverage and find out the specifics. You still might consider a policy specifically for computers. For example, Safeware guarantees full replacement of hardware, media, and purchased software. For as little as \$39, you can protect your machine against natural disasters. (Safeware, 2929 N. High Street, Columbus, OH 43202; [800] 848-3469 or [614] 262-0559.) Other companies with policies that include provisions for computers include the Chubb Group, Kemper Group, Liberty Mutual, Prudential, and State Farm.

a lot about computers and noted his alarm when I spoke of the painting. "I'll bet tiny particles of the paint, which probably has a metal (lead) base, got inside your computer," he sighed. He suggested an easy fix: Remove the add-on cards and carefully rub each of the card-edge connectors with a pencil eraser, and then wipe the connectors with a cotton swab dipped in rubbing alcohol to clean them. I followed his instructions, turned on the computer, and it worked like a dream.

Along the way, I've discovered many other guidelines and tips for cleaning the components of a computer system. Here are some of them:

Keyboard. Dust and dirt seem to love keyboards and find cozy hiding places between and under the keys. Just ask Wilmer Ames, the magazine editor, who once got stuck with a sticky "O" key. "I would be typing along, and when I pressed the "O" I would get a zillion of them on the screen," he recalls. When he brought the keyboard in for repair, he learned that his very short, very curly, dark hair was slipping between the keys, causing the jams. A routine cleaning of the keyboard would have checked the problem before it hit the point of no return; instead, after only a few months of ownership, Wilmer had to buy a new keyboard.

A moist cotton swab or brush (the type that comes with cassette-recorder cleaning kits) can take care of the culprits that get between keys. To get at the particles under the keys, you'll need a can of compressed air that, when directed from the can's adjustable narrow nozzle, will blow away that dust.

Monitor. Do you think your monitor is clean? Try something akin to the "white glove" test. Run a white tissue lightly across the glass. Is the tissue now dirty? If so, you have dust that needs quick attention.

Most household glass cleaners, such as Windex, are safe for your monitor screen. Just be sure the monitor is turned off when you use it.

Printer. Your printer's arch enemies are dust and paper. You can remove both with a can of compressed air or a mini vacuum cleaner. If you take a look at the paper-feed area, you'll probably see some little particles. A good habit is to clean that area regularly with a moist towelette.

Printer ribbons used beyond their prime will begin to fray, leaving tiny bits of inky lint on the print head and elsewhere. Replacing ribbons of-

ten will safeguard against lint and extend the life of your print head. And speaking of print heads, a variety of products are available to help you clean them. If you have a daisy-wheel print head, most typewriter cleaning products will clear ink buildup from the letters. Or, some rubbing alcohol on a cotton swab should do the trick.

Disk drive. Experts disagree on how often to clean disk-drive heads—you'll hear anything from once a week to once every few months, depending on use. What they do agree on is what *not* to use. Any cleanser that is highly abrasive will wear down the heads, certainly overshadowing any benefits.

While the market is flooded with drive cleaning kits (most cost about \$30), not all are safe. Current thought among experts holds the wet/dry method as the most effective and least harmful. These cleaners consist of a fiber disk (some consider DuPont nylon the best) that you spray with a cleanser before slipping the disk into a jacket and inserting it in the drive. The disk spins, while dust, oxide, and grease on the read/write head dissolve. Several wet/dry systems come with disposable fiber disks, so you use a fresh one for each cleaning. That way you won't run the risk of recontaminating the heads by using a dirty cleaning disk.

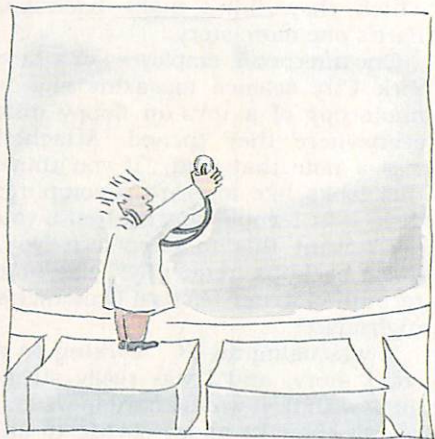
CPU. You shouldn't clean inside your machine too often. (And you should only open up your computer if it has "open architecture," like the Apple II Plus and IIe and the IBM PC. You shouldn't attempt to open up machines such as the Apple IIc, Atari ST, and C 64/128, which have closed architecture.) Yet, over the long run, dust that enters through the cooling fan and air vents and rests on the circuit board can be hazardous. If dust builds into a thick layer, over time, it will prevent heat from escaping and will cause the machine to overheat. When you do clean inside, use compressed air or a small vacuum.

DOSES OF PREVENTIVE MEDICINE

Let's face it. Some disasters are unavoidable. Yet, good preventive medicine can ward off other calamities. Even if you watch the computer room's humidity level, static can occur. But you can help prevent it by keeping a static-free dust cover over your computer when not in use. If the room has a synthetic carpet, try a static mat and an anti-static spray, if

necessary. Watch when you open new software, as the plastic shrink wrap can hold static. A good rule of thumb is to "ground" yourself before you ever touch the system; just touch something metal to remove the charge from your body.

Power surges, which are sudden rises of electrical currents, can be caused by a variety of factors—from a severe thunderstorm to a kitchen appliance—but you're never expecting them when they happen. Unless you



have a surge suppressor, a power surge can wipe out any work that hasn't been saved. Surge protectors, which will prevent your computer from being affected by a surge, range from \$50 to \$150.

Another electrical problem, one that's easier to anticipate but harder to avoid, is a power blackout. To minimize the loss of data in case of a blackout, save your work often—about once every 15 minutes and every time you leave the machine. Of course, the fear of blackouts is just one of the reasons to save your work frequently. There are many others, such as plugs that get accidentally knocked out of a socket, machines that are turned off when you turn your back, and software that locks up.

With computers, it pays to be over-cautious. A few bucks spent now on a dust cover could mean hundreds saved a year down the road. And if anything in your system seems out of kilter (does it make any strange, new sounds?), have it checked out immediately. Problems generally don't disappear, and small ones often grow into disasters. **■**

Where do you turn when your computer needs fixing? Should you dare to fiddle around with your computer yourself? Next month, our "Guide to Computer Repairs" will tell you where to turn for help and will offer some advice on becoming your own computer doctor.

GOODBYE, OLD PAINT-HELLO, COMPUTER ART

A LOOK AT PAINT PROGRAMS: WHAT THEY ARE AND HOW THEY WORK

BY STEVE
MORGENSTERN

Programs that turn artistic energies loose on the computer screen are extremely popular on every personal computer system. We call them "paint programs," but they're really more like painting simulators. They transform the screen into a make-believe canvas and put dozens of imaginary pencils and brushes and an inexhaustible supply of electronic paint at your disposal.

At the same time, just as flight simulator software can't provide all the sights, sounds, and sensations of real flying, a computer paint program won't give you the texture or richness of detail that you can achieve with actual paints, brushes, and canvas.

THE WONDERFUL FLEXIBILITY OF COMPUTER ART

Why "paint" a picture on your computer, then?

First and foremost in my experience, a good computer painting program lets you create artwork that is infinitely erasable. I can put in a line, look at it with a critical eye, and get rid of it entirely in the blink of an eye if it doesn't suit my purposes. Whether you put a big blob of color where you don't really want it or just a single dot in the wrong spot, your computer paint set gives you a degree of flexibility unavailable with any conventional art medium.

While computer paint programs do their best to reproduce conventional pens and pencils, it is their array of special features that provides a potential edge for electronic artists. Want to move a section of your picture from the upper left-hand corner down to the lower right? That's tough to do with an oil painting, but it's a snap with a computer. The same goes for changing the color of a section of a picture, filling an area with an intricate pattern, or duplicating one section of a picture several times over. It's a whole lot easier to manipulate the information in computer memory that represents a picture on screen than it is moving paint on a real-life canvas.

There are other practical advantages to computer painting. When you complete a conventional painting or drawing, you have only a single copy. With computer artwork, you can print out reasonably accurate renditions of the on-screen picture over and over. If your friend has the same computer model you do, you can hand over a disk that will exactly reproduce your picture down to the last simulated brushstroke. And if you're interested in programming, you can use your computer art as the backdrop for all kinds of arcade or adventure games.

THE BASIC TOOLS OF COMPUTER PAINTING

While each paint program has its own distinctive features, there is a core set of capabilities that have become pretty much standardized, thanks in large part to the

tremendous enthusiasm generated by *MacPaint* when Apple introduced the Macintosh in 1984.

Each of the paint programs included in our list of recommended software, and virtually any similar software you're likely to find on your dealer's shelf, will provide you with the following basic artistic tools.

Choice of pencils and brushes. You get instant access to a drawerful of simulated brushes, varying in thickness and shape. Like a calligrapher's pen, slanted brushes let you create lines that vary in thickness, depending on the direction in which you move them. You can also work with the computer equivalent of a pencil point, placing individual dots on the screen.

Another tool frequently found in paint programs is the computer equivalent of the artist's airbrush. A real airbrush sprays a fine mist of colored ink onto paper. The artist builds up the color gradually, darkening an area by going over it repeatedly. The result is a graded tone; the color shifts smoothly from light to dark.

A paint-program airbrush "sprays" a loose pattern of dots over the area it covers. In fact, several programs refer to the feature as *Spray Paint*, which is probably more accurate, since the pattern created is more like the coarse coverage of a spray can than the fine mist of an airbrush. By either name, this technique can produce some nice tonal effects. Generally, though, it works best in a monochrome format, since color spray painting tends to create an unpredictable rainbow pattern on the screen with 8-bit computers, such as the Atari, Apple II, and C 64/128.

Fill. Fill (sometimes called "flood fill") is just what it sounds like. You close off an area with a solid line, then fill it with a color or pattern. The area you want to fill has to be completely enclosed with a line—no breaks or blank spots allowed—or the color you are using to fill will leak out and cover more than you wanted, just like paint leaking out of a hole. That's one situation where you'll be grateful for the next feature.

Undo. A favorite for us fumble-fingered doodlers, the Undo option lets you instantly remove the damage created by your last maneuver. If you draw a line or a shape and decide you don't like it, Undo removes it instantly. Even really messy mistakes, like a flood fill that wipes out the entire screen, will disappear with Undo. A point to remember, though, is that Undo is good only for the very last thing you did. Draw a misplaced line, then another dot or jot, and that line can't be undone with Undo. You'll have to erase it instead.

Incidentally, erasing in a paint program is not like using a pencil eraser. Instead of removing color from the surface, you actually draw over the section you want removed using the background color. The program substitutes the background color for the offending area and the mistake is effectively erased.

Since the advent of *MacPaint*, the icon-based paint program for the Macintosh, icons have taken over the world of computer art. These little pictures tell more at a glance about various paint tools than words ever could. There are many common icons among the software packages we examined. Let's look at *DeluxePaint* on the Amiga to see how these symbols identify the painting tools and functions mentioned in the main section of this article.

1 Built-in brushes. Even though *DeluxePaint* allows you to make your own brushes (see no. 12), it comes with 10 different brush shapes for painting: four circles, four squares, and two "spray-can" type brushes. The smallest circle is currently highlighted.

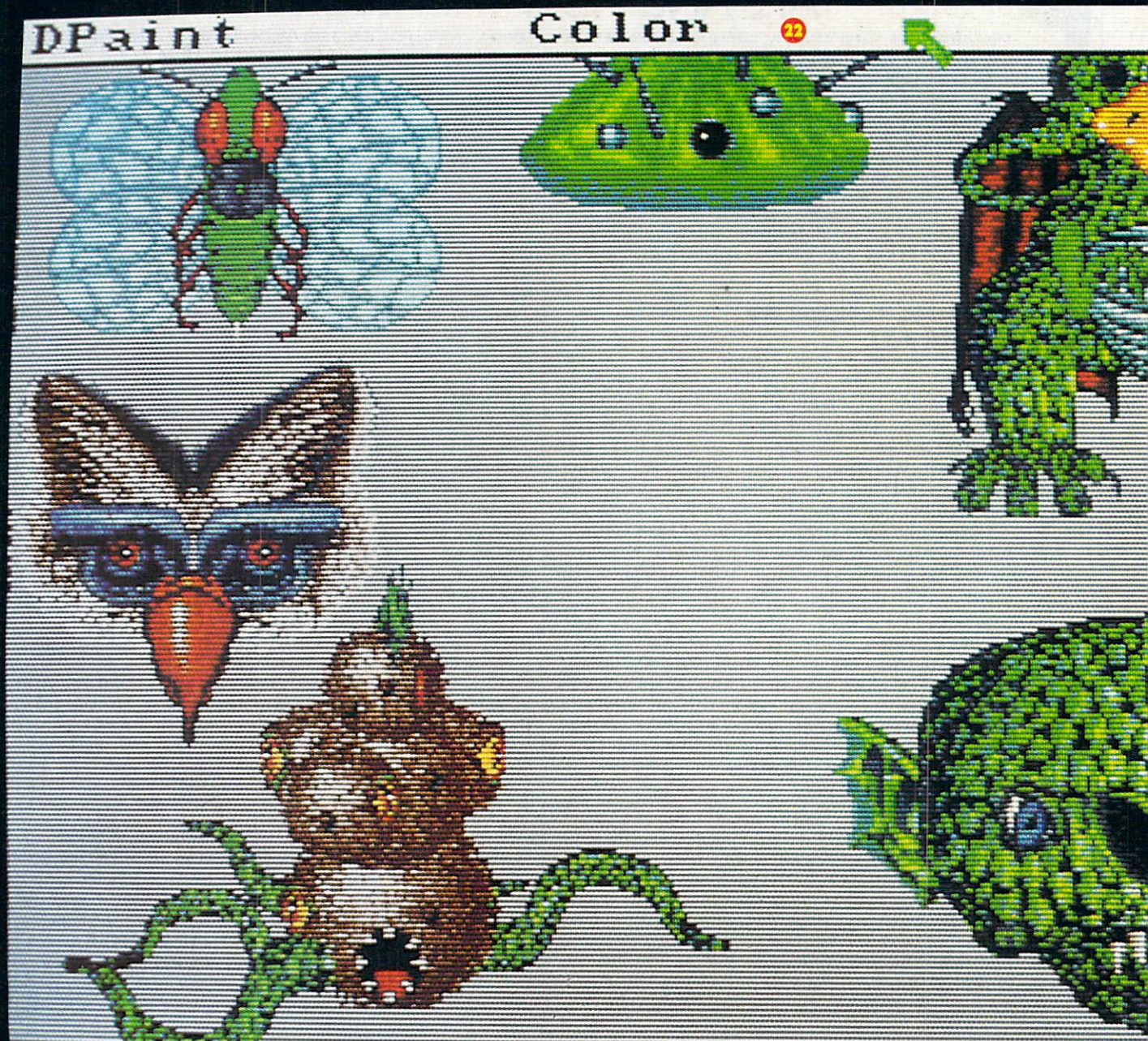
2 Dotted freehand drawing. Choose this icon to paint a dotted or dashed line of any shape (depending on brush) or color (depending on palette).

3 Continuous freehand drawing. After you've chosen a brush shape and palette color, pick this icon to paint. May be the most frequently used tool of all.

4 Straight line. Do you have trouble drawing a straight line? Then you'll love this standard paint program tool that lets you indicate starting and ending points for the line, and then automatically draws it.

5 Curve. What the tool above does for straight lines, this one does for curves. Again, simply indicate starting and ending points, and the software draws in the curved line.

6 Fill. To fill a closed area with a color or pattern, choose this icon. Then place the cursor anywhere in the area to be filled and click on your input device (mouse, joystick, etc.).



THE ICONS OF A PAINT PROGRAM

7 Airbrush. Similar to a spray can. This tool lays down a dotted pattern on-screen.

8 Rectangle. This tool and the three that follow let you make shapes that are either filled (with the color or pattern of your choice) or hollow. The rectangle icon is also for making squares.

9 Circle. See no. 8.

10 Ellipse. See no. 8. Some paint programs combine this icon with the one for the circle.

11 Polygon. See no. 8. For making irregular shapes.

12 Brush selector. This rare tool lets you turn any section of an existing picture into a customized paint brush, which can be saved for later use.

13 Text. A straightforward icon that represents the ability to type in letters, numbers, and other characters with the keyboard.

14 Grid. Establishes an invisible grid that keeps subsequently drawn lines, shapes, and text aligned horizontally and vertically.

15 Symmetry. Paint in one section and your work will be mirrored in either the opposite half of the screen or in all four sections (top, bottom, left, and right).

16 Magnify. What *DeluxePaint* calls Zoom mode. If you want to paint pixel by pixel, zoom in to a section of the picture. This tool is called "Fat Bits" in *MacPaint*.

17 Zoom. Once you've magnified a section (see no. 16), you can "zoom" in further. Operates like a zoom lens on a camera.

18 Undo. Whatever your last move, Undo will remove it. Did you select the wrong color for a fill? Undo. Did you place a circle in the wrong area? Undo that, too. But be careful—with most Undo options, you can only take back your last move, not your next-to-last move, nor any previous ones.

19 Clear. Clears the screen completely.

20 Color indicator. The circle indicates the foreground color (the one you paint with); the color behind it is the background hue (the color you paint on).

21 Palette. The choice of colors available. Most paint programs for the Amiga, Atari ST, and Apple IIGS let you choose from different palettes.

22 Pull-down menus. Various other tools are available through these menus, such as flipping and turning sections or printing out your pictures.

Patterns and Colors. If you want to draw a brick wall using pencil and paper, you have to painstakingly draw each individual rectangular shape, then color it all in. Yawn! I'd much rather draw the wall, then have my computer fill in the space with a prepared brick-shaped pattern—it's done in a micro-snap.

Various patterns can be used with a program's fill capability to cover enclosed areas with the selected pattern. The number of patterns available will vary from program to program, and that's one good way to choose among them. Particularly valuable, though found on only a few programs, is the ability to design your own pattern and save it to disk for use in the future. This really opens up creative possibilities.

The color selection available to you will depend on the computer system you are using. Amiga, Atari ST, and Apple IIGS owners essentially have a rainbow in a box. If you have an Apple Macintosh, though, or an IBM PC or compatible with a monochrome display, you are not going to be traveling in the wonderful world of color. Even with the standard color graphics capability, an IBM PC or compatible is limited to four colors at a time, and while there are EGA, VGA, and even more highfalutin boards available for the PC, they (and the high-quality RGB monitors that support them) are too expensive to be practical for casual users.

Of course, if you're planning to print your artwork in black and white, the lack of color may not be a hardship at all. And even if you're only interested in seeing your masterpiece on screen, you might want to consider trading color availability for increased resolution. When using an IBM PC in monochrome mode, for example, you get much smaller dots, and hence much better detail, than you can working in color. The same is true for the ST and older Atari computers.

Apple II owners should pay special attention to the question of color. The 128K Apple IIe and the Apple IIc offer an additional drawing mode beyond traditional Apple high-resolution called double high-resolution. Double high-res provides a choice of 16 colors. However, not all Apple paint programs work in double high-res; be sure to check the product description for this feature if your system will support it.

Automatic shapes. Paint programs offer a selection of shapes that can be placed in the picture instantly when you specify the size and location. These are generally limited to squares and rectangles, circles and ovals, either drawn as outlines or automatically filled with a color or pattern. To create a rectangular shape you plot one corner on the screen, then move the cursor to the spot where you want the opposite corner and press a button. For circles, you choose the center point, then move the outside edge to create the size you need. In this way, you can draw rectangles with perfectly square corners and circles as nearly round as your computer system's graphic resolution allows.

Zoom. One of the nicest features of computerized painting, the Zoom mode lets you magnify a section of the screen and change the color of the individual dots (called pixels) that make up your picture to suit your purposes.

While you might imagine that this capability would be useful only for fine detail work, I find it helps me throughout the process of creating a picture. I am not a great artist to begin with. Add to that the difficulty of precisely controlling whatever computer drawing tool I am using (more on that later), and it is often easiest to zoom in on a section, work dot by dot, then view the results in actual size, and zip back and forth until I get it right. Some programs even let you zoom into part of the

picture and see it full-sized at the same time.

Text. One more area where you'll find a wide variety of capabilities is adding words to your pictures. Whether you are interested in labeling a business graph, or simply putting your name at the bottom of your masterpiece, the text capability of your paint program lets you do it easily. Some programs offer a generous selection of type sizes and styles to choose from, while others are far more limited. If you expect to do a fair amount of word-and-picture illustration, it's a significant point to consider when choosing your software.

Printing. Most of the paint programs let you print a copy of your artwork on a dot-matrix printer. Some programs are more flexible than others in this area. Make sure the program you are considering works with your printer. If your printer lets you print in color, be sure the program supports this capability, too. Also check for special features, like the ability to print your picture black on white or white on black, or to select the size and orientation (horizontal or vertical) of the printout.

EDITING OPTIONS

This is the area where you'll find the most diversity among paint programs. We have already mentioned Undo, one common editing option. Here are some of the other features you will find, in more or less sophisticated renditions, as you stalk the software shelves.

Cut and paste. You select an area of your picture. Then you can either cut out the section you've chosen and paste it into a new spot or leave it where it is and place additional copies onto other sections of the picture.

Most paint programs are limited to choosing rectangular blocks for cutting and pasting. Some, though—like all Macintosh paint programs we've seen—allow you to select irregularly shaped objects and move only these objects, without the background area around them, for copying.

Another cut-and-paste consideration is whether or not you can move a section of an image from one picture to another, or save a piece of a picture to disk. If you can, you can create your own clip-art library of picture sections to be reused as desired.

PUTTING IT ON PAPER

If you want to transfer your screen image onto paper, you have two choices: your printer and your camera. Even at the professional level, color printers are still far from perfect, but there are a number of reasonably priced dot-matrix printers that offer acceptable color rendition when used with special color ribbons. I have seen some attractive color printouts produced by a very inexpensive Okimate printer, although it's not the best one to use for printing substantial quantities of text. The Apple ImageWriter II, on the other hand, is a general-purpose printer that makes the jump easily from everyday black-and-white text or graphics to decent color printing by snapping in a different ribbon cartridge. At a price point in between, the Epson JX-80 is a good color choice. Once again, be sure that the paint software you choose supports your printer's capabilities before buying.

Taking a screen photograph is certainly the most accurate way to create a paper image of your artwork, and it doesn't require any fancy equipment—just a camera that lets you control the f-stop and shutter speed. Load your camera with ASA 100- or 400-speed film (slide films tend to give richer colors), use a tripod and a slow shutter speed (1/15 or 1/30 second), line up the shot to fill the screen, and focus carefully. Then adjust the f-stop according to the meter reading and fire away.

The key to taking a good screen shot is to eliminate any reflected light from the monitor surface. You can do that by shooting in a dark room at night or making a simple four-sided hood about 2½ feet long out of black cardboard to fit between your camera and the screen.

Flipping and turning. Here you select an area of the picture, then flip it to face a different direction. You may be able to flip an image horizontally (right becomes left), vertically (top becomes bottom), or even at a 90-degree angle, so the section flips onto its side.

Sizing. A strong feature of 68000-machine paint programs in particular, Sizing lets you expand or shrink a section of the picture. If you blow up a small image to a larger size, however, you may have to go back and smooth out the edges. Even with the need for touch-ups, this is a handy feature.

Some programs also allow you to distort the image for creative effects. You might be able to stretch the picture to make it longer and skinnier or even distort one side of the shape to give the illusion of depth.

Symmetry. I haven't found a serious use for this feature yet, but it certainly is fun. Kids especially seem to love it. The Symmetry mode (sometimes called Mirrors) lets you draw in one section of the screen and have your work automatically mirrored in either the opposite half of the screen or in all four sections simultaneously. This lets you create eye-catching kaleidoscopic patterns in the blink of an eye.

HARDWARE CONSIDERATIONS

A crucial factor in selecting paint software is the hardware you will be using. We already mentioned the importance of your computer's graphic capabilities. Equally important is the device you use as a drawing tool.

Some paint programs work with your computer's keyboard. While this can be a stiff way to work, you generally do have good control of your graphics tools. Joysticks can be used with many programs, but that's a tough way to paint. No matter how carefully you work, it's difficult to maintain decent control with a joystick. If that's all you have, though, see if there's a switch to disable the joystick's self-centering feature—that's what brings the stick automatically back to the middle when you let go. It is much easier to control the movement when you don't have to fight those little internal springs.

A mouse is a good tool for computer drawing, despite the fact that more than one critic has described mouse-painting as "drawing with a brick." The movement of the mouse across a flat surface is fairly similar to your natural movements with a brush or pencil over paper, and the accuracy of your cursor placement will be satisfactory for all but the most demanding jobs.

The closest we come to recreating the traditional pencil-on-paper drawing method on the computer is the use of a graphics tablet. Professional computer artists use sophisticated tablets with a large surface and high degree of sensitivity, but the cost of these devices is too high for most of us. The KoalaPad, however, is a popular choice for home artwork, since it offers reasonable accuracy at a fairly low price. One more point in favor of the Koala product is the decent paint program included with the drawing pad. Numerous other programs will accept KoalaPad input as well. (EDITOR'S NOTE: *The KoalaPad is now being sold by different companies for various computers; check with your dealer for availability.*)

A drawing device that feels natural in the hand is the light pen. When you move a light pen across the screen, the computer can read the location and follow your actions, letting you "draw" directly on the screen. This was a big hit with our kids, though for my taste it's easier to work on a flat surface than to constantly reach over to a vertical monitor. As far as software is concerned, the light pens we've seen come with their own paint software and are not supported by other programs.

THE BIG PICTURE

To say that computer paint programs are very different from actual painting doesn't mean they're less satisfying, merely different. In the hands of a talented artist, the computer screen offers a unique artistic medium, with its own distinctive combinations of light, color, shape, and size to be exploited. For those of us who are more doodlers than da Vincis, computer painting offers power-

ful editing tools that make it far easier to create a good-looking image than with real-life brushes and pencils.

Whatever category of artistic ability you claim as your own, if you understand the range of paint program capabilities available, and the possibilities and limitations presented by your computer equipment, you'll get a lot of enjoyment out of pushing make-believe brushes across a simulated canvas.

SOME RECOMMENDED PAINT PROGRAMS

Aegis Images. Aegis Development; (213) 342-9972. Amiga. \$40. Works with mouse.

Provides complete graphics control. Special features include customized paintbrush, air-brush controls, pattern editing, image resizing, rotation to any angle, excellent variable magnification and color control, saving picture sections, and a helpful positioning grid.

Beagle Graphics. Beagle Bros; (619) 296-6400. 128K Apple IIe/IIc. \$60. Works with mouse, graphics tablet, KoalaPad, joystick, paddles, keyboard.

Includes an adequate double high-res paint program and a superb programming tool to incorporate double high-res art in your own BASIC programs. Paint program includes 256 colors and patterns and 16 brushes, but lacks printing capability.

Blazing Paddles. Baudville; (616) 297-3036. Apple, Atari, C 64/128. \$35. Works with mouse, KoalaPad, joystick, paddles, trackball, light pen.

One of my favorite easy-to-use paint programs; makes access to features and disk files especially simple. Save and retrieve sections of pictures to disk. Mix colors to create desired blended patterns. Build pictures using prepared "shapes."

CoCo Max II. Colorware; (718) 296-5916. 64K Tandy Color Computer. \$80. Works with joystick, KoalaPad, mouse.

Produces handsome high-res graphics using plug-in module provided. Macintosh-style software includes dozens of sophisticated features, including pattern editing, sizing of images, wide typeface selection, image capture without background, positioning grid, paint with picture section, and color printer support.

The Complete Graphics System. Polarware; (312) 232-1984. 128K Apple IIe/IIc. \$40. Works with mouse, graphics tablet, KoalaPad, joystick, paddle, keyboard.

Works in both high-res and double high-res. Excellent choice of brushes and color-blended patterns. Includes on-screen coordinates for positioning and the ability to edit and save typefaces. Lacks printing capability and Symmetry, but

can flip images. Special features for programmers, too, such as creation of shapes in Applesoft BASIC, and instructions for using pictures in programs.

Dazzle Draw. Broderbund Software; (415) 479-1170. 128K Apple IIe/IIc. \$60. Works with mouse, Apple Graphics Tablet, KoalaPad, or joystick.

Excellent double high-res program includes 120 patterns plus ability to create and save your own. Unusually powerful fill capability, with color switching, positioning grid, slide show utility, and color printer support. You can also save picture sections to disk.

D.E.G.A.S. Elite. Batteries Included; (416) 881-9941. Atari ST. \$80. Works with mouse, keyboard.

Full-featured program allows editing and saving patterns, fonts and brushes. Selected areas can be used as brushes, stretched, distorted, sized. Excellent flexibility in magnification and slow-draw functions. Keeps up to 8 screens in memory simultaneously. Adjustable grid for positioning.

DeluxePaint. Electronic Arts; (415) 571-7171. Amiga, Apple IIgs (*DeluxePaint II*). \$100. Works with mouse, keyboard.

Unleashes the full graphics power of the Amiga with admirable simplicity. Noteworthy special feature is brush creation that turns any picture section into full-color paintbrush. Also offers pattern editing, image resizing, rotation to any angle, excellent variable magnification, saving picture sections, and a positioning grid.

Doodle. Omni Unlimited; (818) 795-6664. C 64/128. \$40. Works with joystick, trackball.

Nice ease-of-use features include adjustable cursor speed and on-screen grid for precise positioning. Lacks Undo, air-brush, and pattern fill, though. Extensive printer support.

Flexidraw. Inkwell Systems; (619) 268-8792. C 64/128. \$100. Works with light pen (included).

Unusual system: pictures drawn in black and white, then colored with separate program provided. Two screens in memory simultaneously. Good typeface selection. Excellent printer support, including color and plotter; choose size and position of printouts. Extra features in-

clude BASIC programming graphics utilities, sprite editor, and picture transmission utility for modem.

geoPaint. Berkeley Softworks; (415) 644-0890. C 64/128. \$60. Works with joystick, trackball.

Part of the GEOS utility package, a Macintosh-like desktop for C 64/128. The *geoPaint* module features good selection of patterns, brushes, and type, excellent ruler function for precise position measurement, unusually flexible color change tool, 90 degree image rotation, and saving picture sections to disk. Extensive printer support, including color.

Grafix Pro. The Software Touch; (619) 549-3091. 64K Apple. \$30. Works with mouse, graphics tablet, joystick, keyboard.

A Macintosh-style art program featuring easy-to-use pull-down menus, a well-designed "Fat Bits" Zoom mode, good selection of paint brushes and fill patterns, and excellent choice of typefaces (21 included). Flawed by difficulty of printer set-up.

The Graphics Magician Junior. Polarware; (312) 232-1984. Apple, C 64/128. \$25. Works with mouse, graphics tablet, KoalaPad, joystick, keyboard.

Basic paint functions in an easy-to-use format. Features wide choice of blended color patterns. Lacks text entry, Undo, Symmetry, printing. Apple version also supports double high-res on 128K machines.

IBM Drawing Assistant. IBM; (305) 998-6107. 256K IBM PC/PCjr. \$169. Works with mouse, joystick, keyboard.

Good, simple program with excellent user manual and several advanced features, such as 15 brush choices, pattern editing, positioning grid, ability to keep two pictures in memory and move clippings between them. Extensive clip-art collection provided. Good printer support, including color.

PaintWorks. Activision; (415) 960-0410. Atari ST. \$70. Works with mouse.

Can be used with all three ST graphics modes, including high-res with monochrome monitor. All standard tools available; also does concentric boxes, circles, and ovals. "Clipboard" allows you to transfer sections of art from picture to picture. Lets you edit patterns or create new ones.

PC Paintbrush Plus. Z-Soft; (404) 980-1950. 320K IBM PC/PCjr. \$149. Works with mouse, graphics tablet, joystick.

Both powerful and easy to use, with many advanced features that include image sizing, tilting, distortion, and 90 degree flip. Also offers pattern and color editing, good type selection, saving sections of images to disk, capturing images from other programs, fine adjustment of cursor movement speed, and a variable zoom. Excellent print-out control.

PC Paint Plus. Mouse Systems; (408) 988-0211. 256K IBM PC. 384K PCjr. \$100. Works with mouse.

Not as many features as *PC Paintbrush Plus*, but still noteworthy for text handling—justification, centering, and fancy fonts. Also adjustable cursor speed, positioning grid, image capture from other programs, and saving picture sections to disk. Excellent printer selection, including color; select print size, print picture sections.

Picasso's Revenge. Progressive Peripherals & Software; (303) 825-4144. C 64/128. \$60. Works with light pen (included).

Includes hardware (light pen), paint software, and multipurpose print utility that supports many makes and models. Includes create and save patterns and positioning grid. Several keys disabled by light pen, so text entry difficult. Lacks Undo.

Stickybear Drawing. Weekly Reader Family Software; (203) 638-2400. Apple. \$40. Works with mouse, joystick, KoalaPad, keyboard.

Though the Stickybear characters don't actually appear in the program, all the basic paint functions are here in simple menu-selection form with clear instruction manual. Includes slide show utility.

SuperPaint. Silicon Beach Software, Inc.; (619) 695-6956. 512K Macintosh. \$99. Works with mouse.

The clear leader in the feature-filled Mac painting competition. Offers every imaginable paint tool (more than *MacPaint*) plus sophisticated object-oriented drawing tools similar to *MacDraw*. Three levels of magnification, color printing, image rotation to any angle, special LaserWriter printing capabilities—the works! **FC**

THE TANDY 1000 EX

A "START-UP" COMPUTER THAT IS IBM COMPATIBLE

BY STEPHEN MILLER

When Radio Shack dropped its best-selling Tandy 1000 last July in favor of two new IBM compatible systems—1000 EX and 1000 SX—many wondered why. While the original 1000 had some shortcomings, it ran practically all IBM software and was a good machine that proved to be popular.

Why didn't Tandy take to heart the adage, "If it ain't broke, don't fix it?" In fact, Tandy didn't really fix the 1000—it gave it a split personality. The 1000 EX was designed with schools and families in mind, and sells at an affordable price. The 1000 SX is a more complete system, for those who want to get down to serious applications.

The shapely 1000 EX is a one-piece unit, with a built-in disk drive on the side, like an Apple IIc. No other IBM compatible has such a distinctive design. On the back are ports for a parallel printer, composite and RGBI color monitors, TV, headphone, both 5.25-inch and 3.5-inch disk drives, and two joysticks. *Personal Deskmate*, a multiprogram software package, comes with the EX.

Deskmate looks good on the CM-5 color monitor (\$300), which Tandy sells with the system. The EX can also be used with the VM-4 monochrome monitor (\$129) and the high-resolution CM-10 RGBI (\$459), which is recommended if you want to do a lot of text work in color.

The EX is light, but solid. While I wouldn't call it a portable computer, it can be moved easily. The EX weighs only 11 pounds (without a monitor or second disk drive).

SOFTWARE

I ran several programs to test for IBM compatibility (*Flight Simulator*, *PC Pool Challenge*, *1-2-3*, *dBase III*), and all worked just fine. None of the programs had any problems with the EX's faster speed (7.16 megahertz as opposed to the IBM PC's 4.77 megahertz).

If need be, you can switch to the



slower speed of the IBM PC. You can either press the F4 key when you first turn on the computer, or type MODE SLOW before loading the program.

KEYBOARD

The Tandy 1000 EX's keyboard has a full complement of keys, including 12 function keys, separate BREAK and PRINT keys, and a HOLD key (which stops scrolling). The problem is that it's perhaps a little too compact.

Because the function keys are so close to the top row (instead of on the side, as on most IBM compatibles), I kept hitting the F1 key when I wanted to hit the ESCape key, and vice versa. The PRINT key and the ALT key are also too close together.

EXPANSION

The EX is certainly expandable, but because of its small size can only

take three expansion boards. The PLUS expansion adapter (\$129.95), which increases memory from 256K to 384K, also adds the other two slots. You can expand memory to 640K by adding chips to the PLUS expansion board. Only PLUS expansion boards from Tandy will work in the EX.

PERSONAL DESKIMATE

Personal Deskmate is an ambitious series of programs (includes Text, Worksheet, Filer, Paint, Calendar, Telecom, Notepad, Calculator, and Phone Directory) that comes on three disks. *Personal Deskmate* tries for Macintosh-like simplicity, allowing the optional use of a mouse or joystick.

To use *Personal Deskmate* effectively, you'll need two disk drives. With the basic one-drive system, you will spend a lot of time swapping disks. This is especially tiresome because the disk drive activity light is on the side of the computer and can't easily be seen. The *Personal Deskmate* keyboard commands can be a little confusing in the beginning.

I used a joystick with *Deskmate*, but found it sluggish. A mouse (\$99.95) may work more smoothly.

WHO SHOULD BUY?

Buyers who feel they need IBM compatibility at a relatively low price, but want to buy from a "brand-name" company with nationwide service, would do well to look at the EX. You can get "in" at a low price and add to the system as your needs increase.

For those buyers whose software needs are centered on gaming or uncomplicated applications—writing letters, keeping family or organizational mailing lists, budgeting or telecommunications—*Personal Deskmate* will fulfill those functions. Of course, for telecommunications, you'll need to buy a modem.

Finally, the EX, which is also being sold to schools, has one feature that parents will appreciate. It has both a volume control and a headphone jack. In homes with EX's, you may hear the phrase "Turn down the computer!"

TANDY 1000 EX FACTS

SUGGESTED RETAIL PRICE: \$599

MEMORY: 256K (expandable to 640K)

HARDWARE INCLUDED: One 5.25-inch disk drive; monochrome and color/graphics adapters

SOFTWARE INCLUDED: *Personal Deskmate*, MS-DOS 2.11, GW BASIC

CONNECTORS: Parallel port, composite video, RGBI video, TV, two joystick ports, headphone jack, disk drive connector for 3.5-inch or 5.25-inch drive; one to three Tandy-compatible expansion slots

TEXT DISPLAY: 80 characters x 25 lines

GRAPHICS: 16 colors; 640 x 200 top resolution

STEPHEN MILLER writes the Tandy column in *Machine Specifics*.

THE TANDY 1000 SX

GOOD (AND FREE!) SOFTWARE SETS THIS PC APART

The Tandy 1000 SX is an excellent IBM compatible computer. Like the EX, it's faster than the IBM PC (7.16 versus 4.77 megahertz), comes with 384K of memory, two disk drives, nearly all the ports necessary (composite monitor, RGBI monitor, TV, parallel printer, lightpen, and two joysticks), five expansion slots, an updated version of the *DeskMate II* integrated software package, 7,000 Radio Shack stores for support, and a base price of \$1,199.

Compared to the rather cute and distinctive looking EX, the SX seems merely dependable and sensible—just another IBM clone. But *DeskMate II*, the integrated software package that comes free with the computer, really sets the SX apart from the pack. There are certainly better individual software packages available, but *DeskMate II* is one of the few integrated packages that works easily and well.

DESKMATE II

Fortunately, Tandy did not try to redesign the original *DeskMate* (as it did with EX's *Personal DeskMate*)—but merely improved the original. *DeskMate II* comes with six applications: a word processor, a spreadsheet, a data base, a communications package, a calendar/scheduler, a message center, and several sub-functions.

On the main menu, all the applications are on the screen in separate windows, with lists of the files that are contained in each. There's also a window with a calendar, another with Events for Today and a clock in the corner. Other integrated packages would do well to emulate this visual approach.

Another key improvement in the new *DeskMate II* is the ability to switch between two programs. Once you've gone through a setup procedure, you can switch from *DeskMate II* to another application by pressing ALT and =.

This task-switching capability is quite impressive. It's not true multi-tasking (the ability to run more than one program simultaneously), but it comes close enough for practical pur-



poses. I loaded Lotus's 1-2-3 with a fairly large worksheet and kept jumping between it and the *DeskMate II* word processor.

However, you can't switch between two programs if one is a memory-resident program, such as *Sidekick*. Nor can you switch between two programs if one of them is unusually large, because the task-switching function itself takes up 128K. But if your other program can run with the approximately 256K left, you should have no problems.

DeskMate II resides on one disk instead of the three recommended for *Personal DeskMate*. This keeps disk-swapping to a minimum.

DeskMate II can perform most of the productive tasks that people buy computers for—and it's free when you buy the SX. Depending on your needs, you might never need another piece of productivity software.

KEYBOARD

The only real fault I find with the

SX is its keyboard. Like the EX keyboard, it's smaller than normal, so that those used to standard computer keyboards (like me) end up hitting the wrong keys by mistake. In addition, the position of some keys has been changed, so I kept looking in the wrong place for certain keys.

While it's all very well and good not to blindly follow IBM's design, there's something to be said for not going too far astray. IBM's new AT keyboard and its new enhanced PC keyboard both outdo the SX keyboard.

I do, however, like the HOLD button, a one-step solution which stops information from whipping past you if you're working with the DOS TYPE command or trying to read messages at 1200-baud while on-line.

WHO SHOULD BUY?

The SX is best suited for someone who needs a dependable IBM compatible computer at home to continue work begun at the office—but doesn't want to spend any more money than necessary. Beyond office workers, I think a home-run business, which wants to take that first step into computerization, should look seriously at the SX. *DeskMate II* can give that business a taste of the major applications. If a more powerful package is needed, the SX is capable of expanding to meet that need.

For instance, memory can be expanded to 640K by adding chips to the main circuit board (or motherboard), leaving all five expansion slots open. Unlike the EX, which requires proprietary Tandy boards, the SX can accept any IBM-compatible expansion boards, as long as they are 10 inches long or less. One likely addition for expanding business needs would be Tandy's 20 megabyte Hard Drive (\$799), a hard-disk drive on a circuit board that fits in one of the expansion slots.

While the SX system hardware is nothing special, typical of the many IBM clones on the market, *DeskMate II* lifts the system out of the ordinary. It gives shoppers a good reason—besides IBM compatibility, price, and nationwide service—to buy the Tandy 1000 SX. **FE**

TANDY 1000 SX FACTS

SUGGESTED RETAIL PRICE: \$999

MEMORY: 384K (expandable to 640K)

HARDWARE INCLUDED: Two 5.25-inch disk drives; monochrome and color/graphics adapters

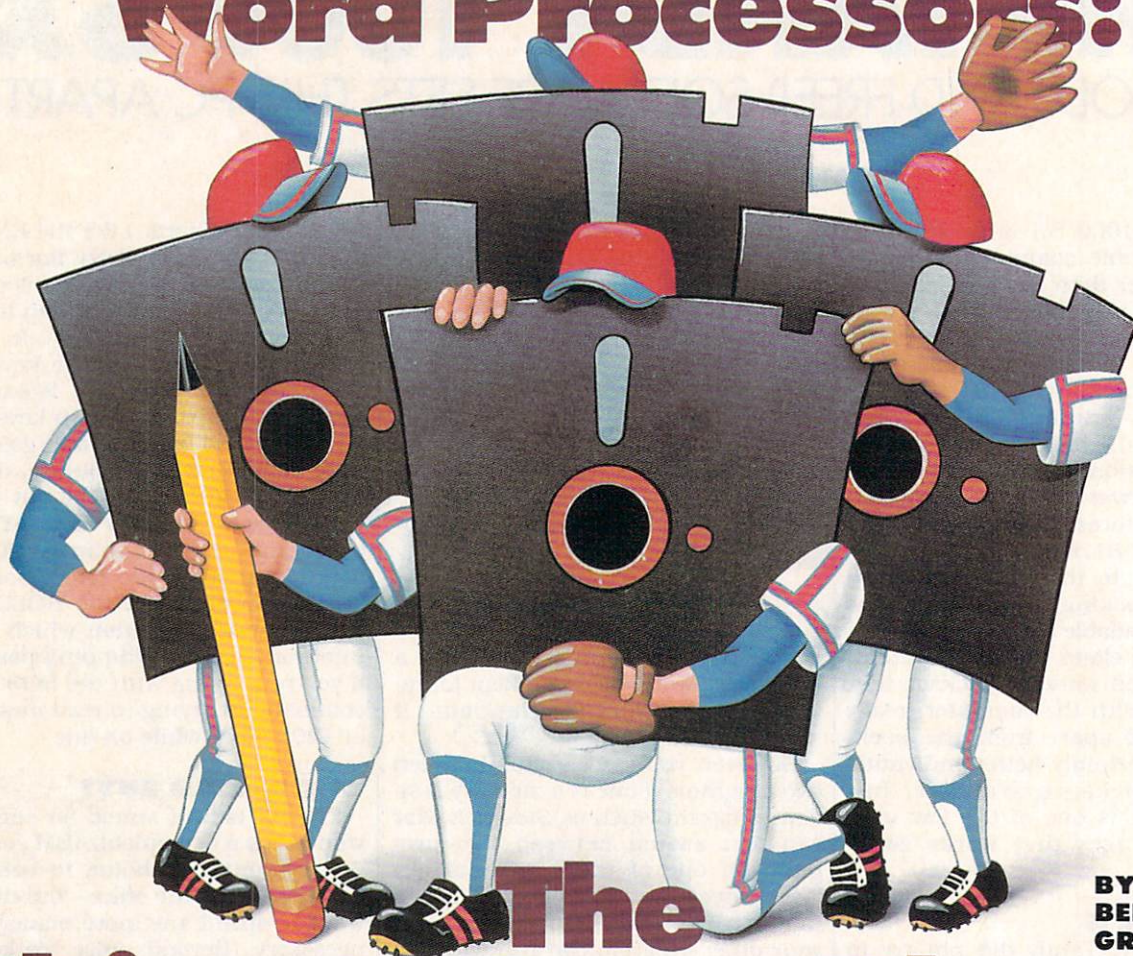
SOFTWARE INCLUDED: *DeskMate II*, MS-DOS 3.2, GW-BASIC

CONNECTORS: Parallel port, composite video, RGBI video, TV, lightpen port, two joystick ports, audio out; five IBM-compatible expansion slots

TEXT DISPLAY: 80 x 25

GRAPHICS DISPLAY: 16 colors; 640 x 200 top resolution

Word Processors:



BY
BERNADETTE
GREY

The Ultimate Team Players

LEARN HOW COMMUNICATIONS, DATA-BASE, AND SPREADSHEET PROGRAMS CAN JAZZ UP YOUR WRITING

Like many other former computer ignoramuses, I stepped gingerly into the information age clutching a word-processing program. While it consumed weeks of coaxing to get me in front of a monitor, it took less than an hour of electronic writing to convince me that computers were everything they were cracked up to be. Still, I was shy of trying any program but a word processor, although I was slowly finding out that a writer does not live by word processing alone. Once I began experimenting with other applications software, I made an important discovery: Word processors make great team players, always there to lend a helping hand.

BOOST THE POWER OF YOUR DOCUMENTS

One strength that most word processors share is the ability to integrate information derived from different applications—such as spreadsheets, data bases, and outliners—into a single document. Whether you're in business or in a family, a writer or an editor, a teacher or a

student, or simply an avid letter-writer, you can benefit from chores that are the forte of software other than a word processor.

Imagine, for instance, reading messages in your word processor that you've captured on-line with your modem and communications program, instead of speed-reading them as the text streams by at 1200 baud. Or think about my friend the baseball historian, who has been compiling pitchers' statistics in a data base for analysis. When he writes an article about his discoveries, he'll simply transfer various reports from the data base into the appropriate places in his word-processed document. Envision the same type of transfer for a business person who wants to include spreadsheet forecasts in a project report. With the examples above (and the ones that follow), we hope to demonstrate ideas for integrating text into a word processor that can help your own writing.

IMPORT FILES INTO YOUR WORD PROCESSOR

As a team player, a word processor improves your productivity when it imports words and numbers that origi-

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ILLUSTRATION BY TOM CUSHIMA

nated with other applications. For instance, while a communications program is best for going on-line, it's often easier to save any text you get on-line into a file on disk and then import it into your word processor. Among all programs, a word processor is the most efficient for scanning text: you can scroll leisurely through what interests you and jump the cursor past the rest.

Using your communications program to move text from an on-line service to a word processor offers other new options. For example, if you didn't team up the two types of software, you would need to send downloaded information directly to your printer or save it on disk and then send it to the printer when you needed a hard copy. Either way, the printout would be messy. You'd undoubtedly get screwy margins, extraneous carriage returns, and blank spaces. But when your electronic file is loaded into a word processor, you can spruce up printouts with headers and footers, set new margins, eliminate those extra returns and spaces using Search and Replace, add boldface and italics, edit and rewrite—and, if you'd like, drop that file into the middle of a separate word-processed manuscript.

NAB DATA FROM SPREADSHEETS AND DATA BASES

Just as most word processors can work with text that has been gathered with a communications package, rivers of data from your spreadsheet and data base can also flow into a word processor. (It's less likely that the rivers will flow in the opposite direction—from a word processor to a data base or a spreadsheet—but possible. For that to work, however, the data in the word processor file would have to be structured precisely, as with *VisiCalc*-inspired DIF files, which can be read by *SuperCalc* and *AppleWorks*, among others.)

Let's say you're recently married, with a child on the way. Between exorbitant rent, car payments, food prices, and utility bills, you're having trouble making ends meet, so you'd like a loan. Should you keep a monthly income-and-expenses budget on a spreadsheet, however, you may be able to take that file right from the spreadsheet and plant it in the middle of a cover letter with a loan application. Or, if you're a sending your insurance broker an inventory of all the valuable jewelry in your home (which you keep in a data base with the records of your other valuables—a smart idea), you might be able to transfer those records from your data base to your word processor.

Relaying information from a data base and spreadsheet to a word processor can be more difficult than transporting ASCII files from a communications package. Generally, it's easiest with integrated packages or programs from the same publisher, but the common denominator is this: As long as your word processor can read ASCII files and your spreadsheet or data base can save reports on disk as ASCII text (it should be indicated in the documentation), you can probably find a way to move it into documents created with your word processor.

EASY EXCHANGE OF INFO IN INTEGRATED PROGRAMS

Integrated packages—software that includes more than one program—are great for mixing and matching information. Grabbing information from the spreadsheet portion of an integrated package and slipping it into a word-processed report is a simple, straightforward process that even the most uneasy computer user can handle. If writing is your main application, then why not always get an integrated package? The trade-off, in most cases, is pow-

er—a separate word processor usually offers more features than the integrated variety. But if you don't need lots of features, the ease of sharing data within an integrated package may make it a better choice.

Among useful examples are *AppleWorks* (Apple Computer)—a word processor, data base, and spreadsheet. People with the C 64/128 machines will appreciate *Trio* (Softsync), also available for the Apple. If you're looking to add a communications module to the other three functions, there's *First Choice* (Software Publishing Corp.) for the IBM PC and compatibles and *Microsoft Works* on the Macintosh. Or you can combine a word processor, data base, and communications with *HomePak* (Batteries Included), for the C 64/128, Apple, Atari, IBM, and Mac.

AppleWorks, for example, will let you print a file or parts of a file from its data base or spreadsheet to the clipboard, a space in the computer's memory the program reserves for temporarily holding data. You can then move or copy it as text into the word processor as needed.

WORD PROCESSOR AND FRIENDS—IN CONCERT!

As mentioned earlier, there are also stand-alone data bases and spreadsheets from which data can flow to your word processor. Such compatible programs are often released in families or series by the same publisher. *TimeWorks* is just one company that publishes a word processor and other applications software that can exchange information. Its programs include *Word Writer*, a word processor, a spreadsheet called *SwiftCalc*, and *Data Manager*, a data base. All are popular on the C 64 and C 128, and are newly available for the Atari ST and the IBM PC and compatibles.

Many others can be found. *PractiCalc* (PractiCorp)—marketed by Spinnaker Software as *Spreadsheet* in their *Better Working* series—will integrate with the word processor and filing program that are also part of that series. Then there's the long-lived PFS series of applications that are available for many different computers. Macintosh owners can include graphics, such as bar charts created with Microsoft's *Excel*, in the same company's *Microsoft Word*, version 3.0.

Often, programs that aren't published or marketed by the same company can share information. Let's look at *ThinkWorks* (Megahaus), an outlining program designed as an add-on to *AppleWorks*. Since *ThinkWorks* outlines can also be saved as ASCII files, any number of Apple word processors will also team up with it, including *MouseWrite* (Roger Wagner Publishing), *Word Juggler* (Quark), and *Apple Writer* (Apple Computer).

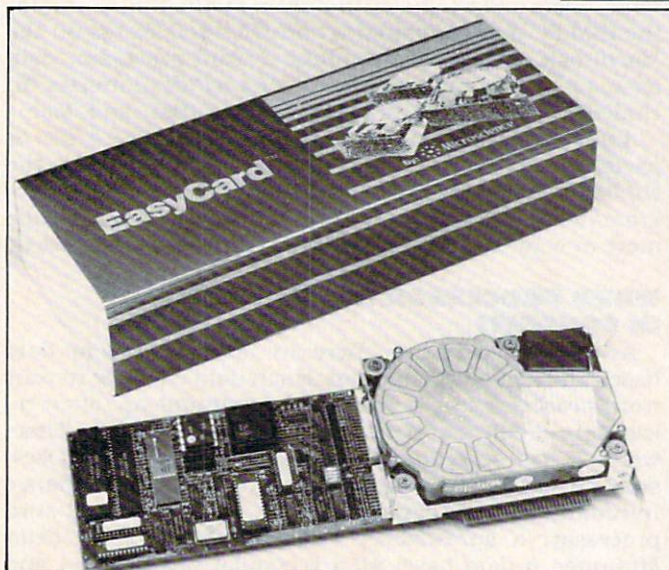
ERASE WRITING STEREOTYPES

While it's unusual to discuss a spreadsheet in a series titled "A Guide to Writing with Computers," it's easy to see how 'riting and 'rithmetic can go hand in hand. Word processors are chiseling away at the long-lasting stereotype of a wordsmith who pounds away at a manual typewriter, smokes filterless Lucky Strikes, and shuns computers, long division, and scientific formulas.

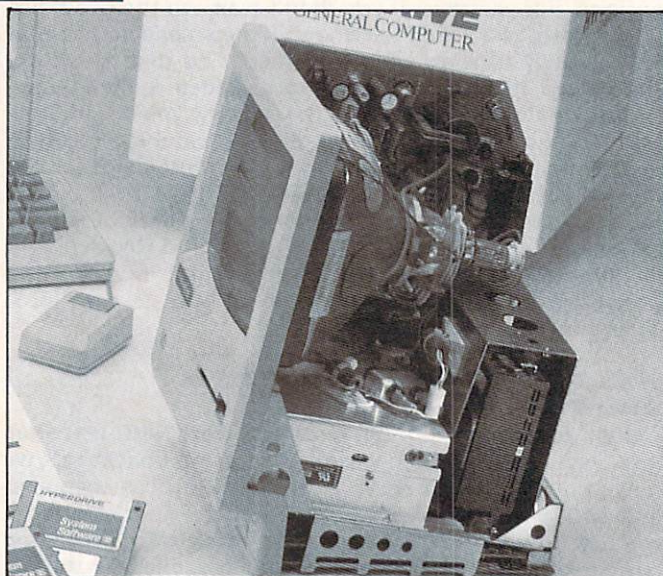
As more writers discover how they can team up their word processors with other software to accomplish more, spend less money, and save time, the prototype is being broken down even further. The one thing that I can't figure out is why, with all of this help, I still have so much trouble making my deadlines. I suppose some molds are harder to crack than others.

EDITOR'S NOTE: Next month, in part 8 of this series, we will evaluate several popular computer systems as word processors. ☐

BUYER'S GUIDE TO HARD-DISK DRIVES



EasyCard: A plug-in circuit-board hard drive



HyperDrive: An internal hard drive



SupraDrive: An external hard drive



Bernoulli 10+10: A cartridge drive with a tape backup

**ADD THE POWER OF 60 FLOPPY DRIVES TO YOUR COMPUTER!
NEVER SWITCH DISKS AGAIN! LOAD PROGRAMS FASTER!**

BY LOUIS R. WALLACE

Perhaps you've been thinking how much you'd like to have a hard-disk drive on your present computer system. Maybe you're thinking of buying a new computer and wondering whether to buy one with a built-in hard drive. Or maybe you're just wondering what a hard drive is and what it can do for you. Here you'll find the basic information, as well as a chart with leading brands and models.

Compared to regular 5.25-inch floppy disk drives, and even the 3.5-inch "microfloppy" drives, hard-disk drives store much more data, can access it more quickly, and can transfer it from disk to active memory faster. They

are also more expensive, require careful operation, and are better suited for some computers and operating systems than others. (See *Computer Requirements* section later in article.)

STORAGE

The most commonly sold hard drives today store 10 megabytes (MB), 20 megabytes, or 30 megabytes. Taking the middle road, 20 megabytes is over 20 million characters, or enough room for 13,000 double-spaced typewritten pages of text! And you can get systems that store 80 MB or more.

By comparison, a standard 5.25-inch Apple IIe drive can only store about 100 pages, a Commodore 64 drive

Contributing editor LOUIS R. WALLACE wrote "Why I Love My Amiga," in the August 1986 issue.

about 130 pages, and an IBM drive about 250 pages. The quad-density 720K drives for the IBM PC, the 720K 3.5-inch drives for the Amiga and Atari ST, and the 800K 3.5-inch drives for the Macintosh and Apple IIe store about 500 to 700 pages.

With the voluminous space on the hard-disk drive, most people will be able to store all the programs used regularly, plus all the data for each program. When you get a new program on a floppy disk, you transfer it to the hard disk (unless it's copy-protected and doesn't have a "hard-disk install" feature), and it's available to you every time you turn the computer on. Thus, you don't have to worry as much about storing, caring for, or switching floppy disks.

SPEED

The second feature of hard-disk drives is speed. In most cases, hard-disk drives will transfer files from disk to memory about 10 to 20 times faster than floppy disk drives. Most programs load in a few seconds, almost as soon as your fingers are off the keyboard.

Disk-drive speed is a function of two factors. The first is access time or how long it takes to find the data on the disk. With a hard-disk drive, access can take from .017 seconds (17 milliseconds) to .02 seconds (20 milliseconds). Most IBM PC-compatible hard drives are in the 50-80 millisecond range, whereas most floppy disk drives take a second or more to find the data.

The second factor affecting speed is the transfer rate—how long it takes to actually load a program or file once it's located. Most hard drives transfer data at about 100K per second, while some floppy drives transfer at about 15K per second.

FIXED AND REMOVABLE HARD-DISK DRIVES

There are two main types of hard drives—removable and fixed. Fixed drives may fit inside the computer's system unit or come as a free-standing unit—just like floppy disk drives. Fixed drives, which are much more common than removable drives, do not allow you to exchange disks as you can with floppy disk drives. Once a fixed disk is full, you either erase the data or back it up to a floppy disk or tape and then erase it.

Fixed drives usually contain a polished aluminum disk that has been covered with a magnetic material. The disk is totally enclosed in a sealed, airtight case. This is necessary because of the high speed at which it spins (3-4 thousand rpm), and so that no dust or small particles come between the drive head and the disk.

Unlike floppy drives, the magnetic head on hard drives never touches the platter; instead, it rides on a cushion of air. As a result, it never has to be lifted in order to change read (or write) locations. Combined with the high rate of rotation, the lack of contact by the head helps explain some of the hard drive's speed in accessing data.

Removable hard-disk drives are functionally similar to

HARD-DISK DRIVES AT A GLANCE

Company	Computer	Model*	Capacity	Price**	Type***
AMERICAN MITAC (800) 321-8344	IBM PC	ADK 200H	20 MB	\$499	I
AMPEX CORP. (415) 367-2011	Apple II, IBM PC	PCM 127	20 MB	\$1,695	E
CSI (800) 523-8275	C 64, C 128	ST10C	10 MB	\$995	E
FIRST CLASS PERIPHERALS (800) 538-1307	Apple II, Atari ST, Amiga, Macintosh, IBM PC	Sider	10 MB	\$695	E
GENERAL COMPUTER (617) 492-5500	Macintosh	HyperDrive	10 MB 20 MB	\$1,399 \$1,699	I I
IOMEGA CORP. (801) 778-3000	IBM PC/XT/AT, Macintosh	PCO-A110 10 + 10	10 MB 10 MB	\$1,995 \$2,695	E,C E,C
JOSEPHINE COUNTY TECHNOLOGY (503) 474-5678	IBM PC/XT, C 64	JCT-110	10 MB	\$453	I
LODOWN (408) 438-7400	Macintosh	LoDown 20	20 MB	\$999	E
MICROBOTICS, INC. (214) 437-5330	Amiga	MAS-Drive 20	20 MB	\$1,495	E
MICROSCIENCE INTERNATIONAL (415) 961-2212	AT&T 6300, IBM PC/XT	EasyCard 20	20 MB	\$895	I
PARADISE SYSTEMS (415) 588-6000	Macintosh	Mac 10	10 MB	\$999	E
PLUS DEVELOPMENT CORP. (408) 946-3700	IBM PC/XT	Plus HardCard 10 Plus HardCard 20	10 MB 20 MB	\$695 \$895	I I
SEAGATE (800) 468-DISC (800) 468-DISK (in California)	Apple II, IBM PC/ XT/AT, Macintosh	ST 225	20 MB	\$400	I
SUNOL SYSTEMS (415) 484-3322	Apple II, IBM PC, Macintosh	Sun*Disk	21 MB	\$1,295	E
SUPRA (503) 967-9075	Atari ST, Amiga, Macintosh	SupraDrive	20 MB	\$799	E
SYSGEN Inc. (800) 821-2151	IBM PC/XT/AT	DuraPak cart.	30 MB	\$2,095	I
TANDY-RADIO SHACK (817) 878-4969	Tandy 1200, 3000, 6000; Tandy 1000, 6000	35 MB 10 MB	35 MB 10 MB	\$2,995 \$2,195	E E,C
TECMAR (216) 349-1009	IBM PC/XT/AT	Q60W20	20 MB	\$3,495	E
XETEC, INC. (913) 827-0685	C 64	Lt. Kernal	20 MB	\$900	E

*Most manufacturers sell a wide range of models, not all of which are included here. **Price is for hard drive only, and does not include cost of interface or controller card.

***C = Removable cartridge; E = External; I = Internal

fixed drives but differ in several important respects. First, a removable drive allows you to greatly expand the total storage of your system. When one data cartridge is full, simply plug in another cartridge, much as you would a floppy disk.

Second, removable hard drives allow you to safeguard sensitive data you don't want others to see; you can remove the data cartridge and lock it up. Removable hard drive cartridges usually store 5 MB to 20 MB. They are often sold in dual-drive versions, which makes backing up your data as easy as backing up a single floppy disk on a dual floppy system. Cartridges can cost from \$25-\$100 apiece. In general, removable drives are more expensive than fixed drives.

COMPUTER REQUIREMENTS

If you think you want a hard drive, the first thing to consider is whether your computer will support a hard drive at all. Your operating system must work with hard drives, and there must be a way to connect the drive to the computer.

Most of the IBM PC-compatibles are designed to work with hard drives. Many are sold with built-in hard drives. Exceptions are the Tandy 1000 EX, the PCjr, and some of the portables. In any case, you may need a larger power supply (see below).

Tandy Models I, II, III and 4 must use hard drives especially designed for them. An Apple II using PRODOS will support hard drives nicely. The Macintosh and Macintosh Plus can be used with hard drives (the Mac Plus has a built-in interface). The Amiga supports hard drives of practically any size, as does the Atari ST computer, which also has a built-in interface. The Atari 800 systems, like the C 64 and C 128, will require extra hardware and software, as the built-in DOS has no provisions for handling hard-disk drives.

In all cases (except for the Macintosh Plus, Atari ST, and the IBM PC/AT, PC/XT/286), you will need an interface and/or controller card to connect a hard-disk drive to your computer. The controller card is generally included with the purchase of a hard-disk drive.

Another consideration when buying a hard drive for your computer is the required power supply. Most external drives have their own power supply, but internal drives usually require power from the host computer. In general, 130 watts is considered adequate for a computer with a 10-MB drive and several other expansion cards.

You should check with the manufacturer for the power requirements of a particular drive and see how well your system can support it. Some computers, like the IBM PC/AT, come with large power supplies (190 watts), but most have a smaller 60- to 100-watt power supply. And if you already have a large number of peripherals plugged into your computer, it may need a larger power source. Don't forget to include this potential cost when assessing a hard-drive purchase.

BACKING UP A HARD DRIVE

"Backing up" your hard drive is very important. (This is true even if you are only using floppy disks, but since hard disks store much more, you can lose much more.) As reliable as computers are, at least once during your computer's lifetime you can expect a disaster to occur. You can cause physical damage to the drive, or even more likely the accidental formatting or erasing of the data stored on the disk. If you have a backup of your data, then you can survive a drive failure.

You can either back up hard-drive data to a floppy disk(s), or to a tape. Unfortunately, even a relatively small

10-MB drive is equivalent to about 30 360K diskettes. It can take several hours to back up a hard drive to floppies, though if you only do one or two files at a time it won't take too long.

On some computers you won't even be able to back up a whole hard disk to floppies, as the COPY command will stop functioning when one floppy is full. If your file is 200K, and the floppy holds 140K, you're out of luck. However, MS-DOS has a special backup command that is designed specifically to back up a hard-disk drive to floppies. When one floppy is full, the system pauses while you put in a fresh disk.

The ease of backing up data is one reason why removable hard drives with dual cartridges, such as the Bernoulli 10 + 10 (a 10-MB system with 10-MB backup), are becoming so popular. They can back up a 10-MB disk in a few minutes, not hours. But there's another alternative for quickly backing up your data. This is to use a magnetic tape system.

Magnetic tape has been the major means of mass storage on computers (since computers took up whole rooms), so it is no surprise that it was adapted to microcomputers. These tape systems, which can cost from a few hundred to thousands of dollars, are usually only used by those who require very high data integrity and/or high capacity (30-70 MB) backup. Backup tape systems are both fast and reliable. A good example is the TECMAR QIC-60, which can quickly store up to 60 MB (sixty million characters) of data. Should your hard drive "crash," you can reformat it, then read back all 60 MB of data. (See the Computer-Video Connection for information about using a VCR as a tape backup system.)


THE CIRCUIT BOARD AS HARD DRIVE

Another type of fixed hard drive for IBM PC or compatibles has been introduced recently. This is the hard drive on a card, first developed by Plus Development Corporation. These circuit-card hard drives fit within the PC using one of its internal slots normally used for RAM cards, controllers, graphics cards, etc. While Plus Development's HardCard 20 will fit within the space allotted for a single card, others may require more space. And, just as with any internal-drive system, you must be aware of the power requirements of the hard-card drives.

DO YOU NEED ONE?

Most general-purpose users don't really need a hard-disk drive, though it certainly makes computing easier. Loading programs is much faster, and not having to fumble for floppy disks is a true blessing. If you find yourself switching between two or more programs frequently, then you'd save time loading programs with a hard drive. If you are accumulating data disks at a rapid rate and having trouble organizing them, then a hard drive would allow you to store most or all of your data in one place, always accessible.

People who would benefit most from a hard drive are those who use a computer daily for some kinds of business tasks. The increased data storage and speed really pay off.

Finally, if you are buying a new computer, you should investigate those that come with built-in hard-disk drives. Virtually all the IBM PC-compatible computers can be bought with hard drives installed. For instance, the Leading Edge Model "D" computer can be bought with a built-in 30-MB hard drive for \$1,995. Checking some of the prices in the chart, which gives a representative sampling of the leading hard drive manufacturers, will tell you what's a good deal. 

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FAMILY COMPUTING is looking for families who are using their computers together in especially rewarding, unique, and/or efficient ways. If you don't think your own family is ready to be our "1987 Computing Family of the Year," nominate friends, relatives, or neighbors who are. Remember, of course, that, although there's only one Grand Prize, there will be lots of other prizes given away.

WHAT YOU NEED TO DO

Here are some of the questions we'd like you to answer. Put your story into essay form, with a maximum of 2,000 words.

- Why did your family buy a computer?
- Has your computer surpassed its original expectations? If so, how?
- How has it changed the lives of family members and how the family does things?
- How does each family member use the machine?
- How does the family use the computer together?
- Also, be sure to include the following information: 1) your name, address, and phone number; 2) computer and other hardware you own; 3) software packages you use most; 4) the month and year your family bought its computer(s); 5) the names and ages of all family members.

Entries will be judged by the FAMILY COMPUTING staff. It's not your technical expertise that's important to us. What is important is how you put your computer to use. The family whose essay

the judges deem best—that is, the family who has made the greatest leaps and bounds with a computer—will become our "1987 Computing Family of the Year." Good luck!

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Apple IIgs Computer System. Includes system (CPU), keyboard, mouse, 3.5-inch disk drive, RGB (color) monitor, and ImageWriter II printer. Suggested Retail: \$2,500

FIRST PRIZE

Okidata Microline 293 Letter-Quality Printer. Suggested Retail: \$949

SECOND PRIZE

Hayes Smartmodem 1200 and Smartcom II Software. Suggested Retail: \$748

THIRD PRIZE

Tandy 102 Laptop Computer. Includes computer, printer cable, and modem cable. Suggested Retail: \$534

FOURTH PRIZE

Home-Control System from X-10 (USA) Inc. Includes three modules, software, and cables. Suggested Retail: \$115

FIFTH PRIZE: FOUR WINNERS

\$100 Worth of Software and Accessories.

SIXTH PRIZE: SIX WINNERS

Subscription to CompuServe Information Service. Suggested Retail: \$39.95

SEVENTH PRIZE: 15 WINNERS

New or Extended One-Year Subscription to FAMILY COMPUTING. Suggested Retail: \$19.97

EIGHTH PRIZE: 20 WINNERS

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The Ofstehage family of South Dakota, our 1986 Computing Family of the Year.

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1. Deadline: Your entry must be postmarked by March 31, 1987.
2. Include a family photo and identify each member on the back.
3. Keep your entry shorter than eight double-spaced pages.
4. Scholastic Inc. employees, advisory board members, and members of their immediate families are not eligible.
5. Previous winners of the "Computing Family of the Year Contest" are not eligible.
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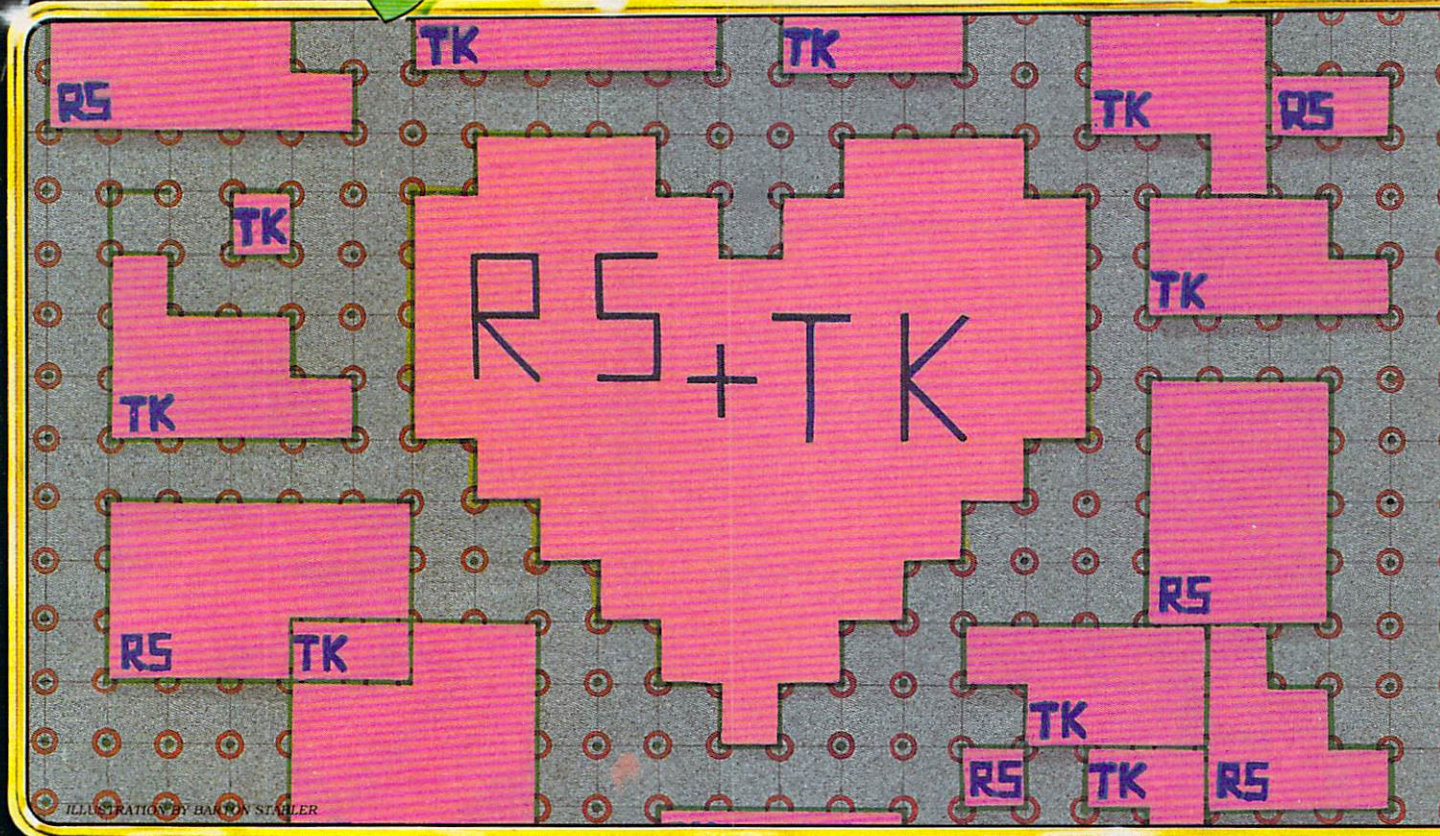


ILLUSTRATION BY BARRY STALLER

F E B R U A R Y

GRAPHICS TUTORIAL

Page 64

Treat someone special on Valentine's Day to a personalized Valentine's Card, and learn to design your own computerized drawing.

FUN AND GAMES PROGRAMS

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Catch IT! if you can, but IT can be tricky!

Page 78

Dots are it in our connect-the-dots game for two players.

MORE PROGRAMS IN K-POWER

Page 83

Listen to your computer's *Heartbeat*, or gaze at a maze-like graphic with a *3-D Motif*

TIPS TO THE TYPIST

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How to type in FAMILY COMPUTING's programs, and what to do if a program doesn't work.

PROGRAMMING P.S.

Page 72

ILLUSTRATION BY JAMES CHERRY III

Cherry

VALENTINE'S CARD

PLAN A SURPRISE FOR YOUR SWEETIE AS YOU LEARN TO DRAW YOUR OWN DESIGNS

BY JOEY LATIMER

Are you tired of losing that special someone on St. Valentine's Day to a cad with a better card? If so, don't fret. This Valentine's Day you can present a card that can't miss. Just type our *Valentine's Card* program into your computer, answer the simple questions, and then arrange it so that your prospective "Valentine" sees the screen (preferably in color). While we guarantee that your offering will outshine store-bought cards, we can't say what might happen if you also place a red rose next to the computer.

TUTORIAL: THE EASY WAY TO DISPLAY YOUR OWN DESIGNS

Programming low-resolution graphics on your computer isn't difficult, but it requires careful planning. Three basic steps were necessary to create the graphics for this month's *Valentine's Card* program, and you can use the same three steps to create your own graphic gems. These steps are: 1) draw your design on graph paper, 2) calculate a table of data based on your design, and 3) combine your data with the drawing section of *Valentine's Card* to make a new program that displays your design on the screen when you RUN it.

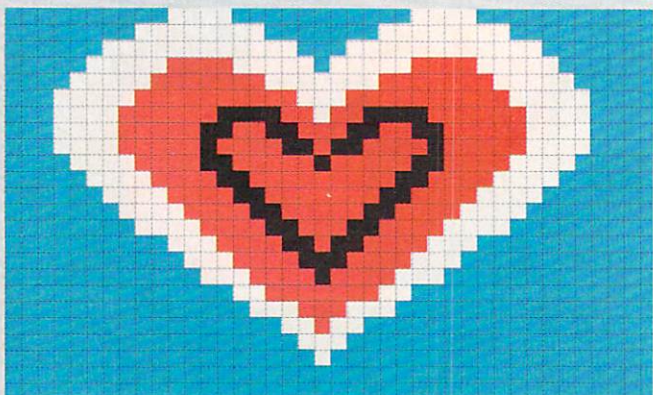
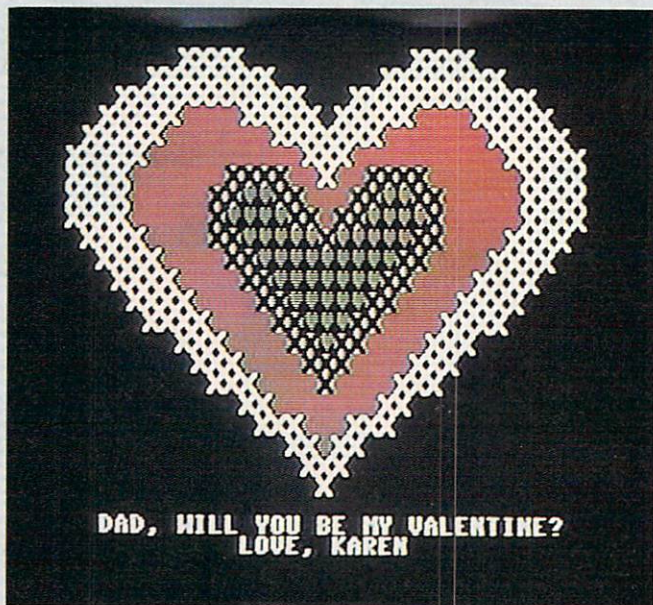
DRAWING YOUR DESIGN ON GRAPH PAPER

First, you'll need a sheet of graph paper displaying the screen layout for your computer. Graph sheets for each of the graphic modes your computer supports can usually be found in the reference manuals included with your computer. (Make photocopies rather than using the graph in the manual.) If no graph sheets are included with your manual, the kind of graph paper commonly found at stationery stores can easily be modified for use. (Check Table #1 to see how the graph paper should be numbered for your computer.)

Once you have a sheet of graph paper and a basic design in mind, lightly draw your design and fill in the squares with a pencil. Some computer brands let you make low-resolution art using colored blocks. Some let you use only characters, while still others let you use colored blocks and colored characters. For the sake of simplicity, when you make your first graphics program, assume that your design will be made up of different colored blocks. (Later, we will show you how to add characters if your machine supports them.) For example, if we wanted to draw the design of Figure #1 on the screen, we would first draw it on a sheet of graph paper and color in the boxes.

THE DATA TABLE

When the design on your graph paper looks the way you want it to appear, you are ready to assemble a table of DATA statements representing your design. This is where problems can most easily occur. The Drawing Routine, the section of the program that is printed in red for each particular machine, requires that the data be set up in a particular order. The numbers that you assemble must be placed in that order for the computer to draw your design correctly.



HOW THE DRAWING PROGRAM WORKS

The drawing routine for each version of the program starts by clearing the screen and READING the number of objects that you want it to draw. From here, the computer goes into a FOR/NEXT loop that starts FOR OB=1 TO NO and executes the loop once for each object that is to be drawn. (An object is a section of the drawing that is one color and character and occupies consecutive columns and rows. The design of Figure #2 is four objects because there is a column and also a row that is not colored.)

Next, the computer READS what columns a particular object will occupy, e.g., columns 3 to 13. It then goes into another FOR/NEXT loop that counts from the first column to the last column. This loop, which begins with FOR CO=Y TO Z, READS the numbers of the first and last rows of a particular column that should be colored, and colors all the boxes in the column from the first to the last row.

How the boxes are colored varies from computer to computer. Some computers, such as the Apple and Atari, have commands that will draw a line, while other com-

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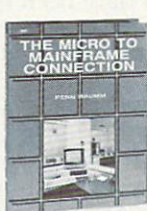
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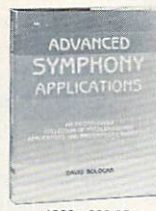
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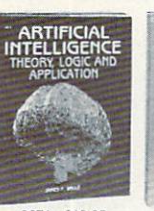
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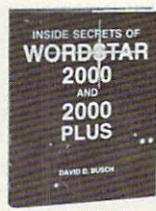
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puters use a third loop to color in one box at a time. Your computer's manual should explain the actual commands.

The numbers in your data table must appear in the same order that the computer expects to READ them. The first DATA statement includes the Number of Objects in your drawing. Additional DATA statements include the Color and/or Character Code, First Column, Last Column, First Row, and Last Row (First Row and Last Row must be repeated for each column).

Since the formula used to READ the data table varies from machine to machine, we will deal with each computer separately (see "Table #1" and "Techniques For Specific Machines" to obtain the exact format for your computer).

COMBINING YOUR DATA TABLE WITH THE DRAWING ROUTINE

After you have created a data table from your drawing, the final step is to combine the Drawing Routine with your newly created data table. You must also remove the word REM from the last line of the routine so that your design does not scroll off the screen. (If the line is 200 REM

GOTO 200, remove the word REM so that the line reads 200 GOTO 200.) Type in the lines that are printed in red in the *Valentine's Card* program, remove the word REM, and add your data table starting at line 1000. (It will be easier if you use the same structure for the DATA table as is used in *Valentine's Card*.) When both the Drawing Routine and data table are combined into one program, SAVE this program to tape or disk right away.

When you first RUN the program, chances are there will be one or two errors. Debugging the program usually requires that you check for commas in the DATA statements that have been inadvertently left out or extra commas that may have been inserted. Also check whether the DATA statements exactly match the data table you created. If your Rembrandt turns into mush on the screen, go back and compare your original design, step by step, with your data table, until you find the mistake. This step is one of the advantages of designing computer graphics on graph paper before you hit the keyboard. You should also double-check to make sure you've typed in the Drawing Routine (the lines in red) correctly.

TECHNIQUES FOR SPECIFIC MACHINES

APPLE II SERIES

Apple II computers let you use only colored blocks for your graphic designs, so a character code is not needed. They give you a choice of 16 colors (see COLOR in your manual) in a 40-by-40 grid when in low-resolution graphics mode. This graphics mode also gives you a four-line text window at the bottom of the screen.

For the example in Figure #1, the DATA would look like this:

1000 DATA 1

2000 DATA 4,3,13,3,13,4,12,5,11,6,10,7,9

2010 DATA 8,8,7,9,6,10,5,11,4,12,3,13

The first number, 1, represents the total number of objects in the data table. The next number, 4, is the color code of the object, in this case green. There is no character code because the Apple uses only solid blocks. The next numbers the computer requires are those for the first and last rows of the object, 3 and 13. The remaining 11 groups of two numbers are the beginning and ending row numbers for each column. If we wanted to change the color of the object, you only have to change the first number of line 2000, the 4, to the code for the new color.

If there is more than one object, repeat the number pattern beginning with the color code for the next object (and change the total number of objects in line 1000).

ATARI 400/800, 600/800XL, & 130XE

The Atari version of *Valentine's Card* uses a graphics mode called Graphics 3, which contains 20 rows of 40 blocks and a four-line text window. The Atari provides 16 colors to choose from for your art. Unfortunately, when

displaying art in Graphics 3, only four colors may appear on the screen at the same time. The SETCOLOR command is used to decide which colors will be in your drawing palette (look for a list of color numbers in your programming manual). To set a color, first you choose the color you want to use and then you decide how bright the color should be. The brightness is set by picking an even number between 0 and 14 (with 14 as the brightest).

These four pairs of numbers must be placed on the first DATA statement before the number of objects. The background color of your drawing must be the first pair on the line; the other three colors can be placed in any order.

After your drawing palette has been set, a command called COLOR is used to determine which color in your palette (set with SETCOLOR) will be used, each time you begin to draw. COLOR 0 tells the computer to draw using the background color. COLOR 1, COLOR 2, and COLOR 3 are the next three colors, in the order in which they were placed in the DATA statement.

For the example from Figure #1, the DATA would appear as follows:

1000 DATA 0,0,7,4,12,8,3,12,1

2000 DATA 3,3,13,3,13,4,12,5,11,6,10,7,9

2010 DATA 8,8,7,9,6,10,5,11,4,12,3,13

The first four pairs of numbers represent the four colors chosen for this drawing. (Notice that you must choose four colors even if only one color will be used.) The first pair, 0 and 0, tells the computer to use a dark gray or black background. The next three pairs; 7, 4, 12, 8, and 3, 12, tell the computer to set different brightness levels of blue, green, and red as the drawing colors.

Once the drawing palette is set, the computer is ready to draw your design. The next number the computer READS, 1, represents the total number of objects in the data table. The first number on line 2000, 3, is the COLOR of the first object, in this case a bright red. (If you wanted to use blue, the 3 would be replaced by 1 because blue is the second color chosen and red is the last color chosen.)

Following the COLOR number are numbers representing the first and last columns of the object, 3 and 13 (since Graphics 3 only lets you draw with blocks, you don't need a character number). The next 11 pairs of numbers are the beginning and ending row numbers for each column.

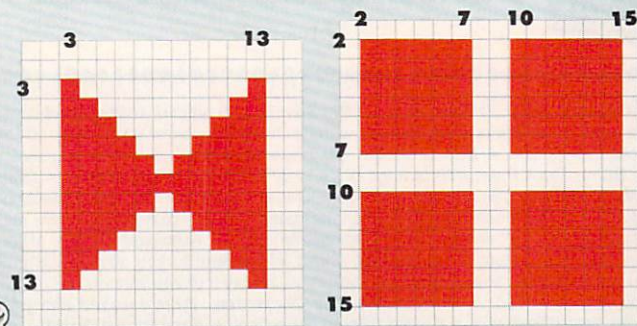


Figure #1: Example for Data Table

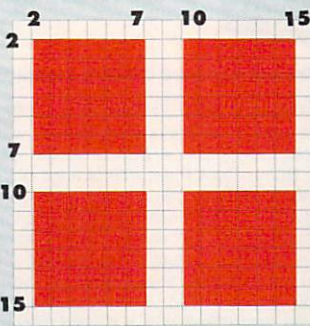


Figure #2: Four Graphics Objects

TABLE 1: COMPARISON OF GRAPHICS CAPABILITIES

Computer	Colors	Characters	Columns	Rows	Format for Each Object
Apple	0 to 15	None	0 to 39	0 to 39	Color, First Column, Last Column,
Atari	0 to 15	None	0 to 39	0 to 19	First Row, Last Row
Commodore 64	0 to 15	0 to 255	0 to 39	0 to 24	
IBM PC	0 to 15	0 to 255	1 to 40	1 to 25	Color, Character, First Column,
Tandy Color Computer	Seven	128 to 143	0 to 31	0 to 15	Last Column, First Row, Last Row
Tandy Model III	None	0 to 191	0 to 63	0 to 15	Character, First Column, Last Column,
					First Row, Last Row

If you are drawing more than one object, the number pattern is repeated, beginning with the COLOR number, in the palette, for each object (and the number of objects given in line 1000 must be changed accordingly).

COMMODORE 64 & 128 (C64 MODE)

The Commodore 64 lets you use letters, punctuation marks, and graphics characters from two character sets in your low-resolution creations. In the *Valentine's Card* program, we used the character POKE codes listed in Appendix B of the Commodore 64 Programmer's Reference Guide. The C 64 supports the use of 16 colors for graphics (listed in Appendix D of Programmer's Reference Guide), and, when combined with 256 characters, makes it possible for you to make beautiful low-resolution art. The screen on the C 64 is divided into a 40 column by 25 row format, and characters and colors can be placed on the screen by POKEing them directly into screen and color memory. This is done by using the POKE statement combined with a math equation for breaking the screen and color memory into rows and columns.

For the example from Figure #1, the DATA would be:

```
1000 DATA 1
2000 DATA 4,160,3,13,3,13,4,12,5,11,6,10
2010 DATA 7,9,8,8,7,9,6,10,5,11,4,12,3,13
```

The first number, 1, represents the total number of objects in the data table. The next number, 4, is the color code, or POKE for purple, the color of the first object in the data table. The third number, 160, is the screen display code, or POKE for the character that is a solid block. The next numbers, 3 and 13, are the first and last columns of the object. The following 11 pairs of numbers are the beginning and ending row numbers. To change the color of the object, change the first number of line 2000, the 4, to the code for the new color you want.

If there is more than one object, the number pattern is repeated, beginning with the color code for each object (and the number of objects given in line 1000 must be changed accordingly).

IBM PC AND COMPATIBLES

The IBM PC and PCjr allow you to use all of the ASCII characters plus many special graphics characters and symbols in your artwork (see a list of these characters and their character numbers in your BASIC programming manual). The IBM PC gives you a choice of 16 colors (see COLOR in your manual) in a 40 by 25 text mode block.

For the example in Figure #1, the DATA would look like this:

```
1000 DATA 1
2000 DATA 4,219,3,13,3,13,4,12,5,11,6,10
2010 DATA 7,9,8,8,7,9,6,10,5,11,4,12,3,13
```

The first number, 1, represents the total number of objects in the data table. The next number, 4, is the color code of the object, in this case red. The third number, 219, is the character code for a solid block.

The next numbers required are the first and last columns of the object, 3 and 13. The remaining 11 groups of two numbers are the beginning and ending row numbers

for each column. To change the color of the object, change the first number of line 2000, the 4, to the code for the new color you want.

If there is more than one object, the number pattern is repeated, beginning with the color code for the next object (and the number of objects given in line 1000 must be changed accordingly).

TANDY COLOR COMPUTER

The Tandy Color Computer lets you use only special graphics characters (see a list of these characters and their character numbers in your BASIC programming manual). You have a choice of seven colors (see COLOR in your manual) in a block of 32 columns by 16 rows when in text mode.

For the example in Figure #1, the DATA would look like this:

```
1000 DATA 1
2000 DATA 32,143,3,13,3,13,4,12,5,11,6,10
2010 DATA 7,9,8,8,7,9,6,10,5,11,4,12,3,13
```

The first number, 1, represents the total number of objects in the data table. The next number, 32, is the color code of the object, in this case blue. The third number, 143, is the character code for a solid block.

The next numbers the computer needs are the first and last rows of the object, 3 and 13. The remaining 11 groups of two numbers are the beginning and ending row numbers for each column. To change the color of the object, you only have to change the first number of line 2000, the 32, to the code for the new color you want.

If there is more than one object, the number pattern is repeated, beginning with the color code for the next object (and the number of objects given in line 1000 must be changed accordingly).

TANDY MODEL III & 4 (MODEL III MODE)

The Tandy Model III/4 gives you a choice of 64 special graphics characters, plus the normal text characters for your designs (see a list of these characters and their character numbers in your BASIC programming manual). But it does not give you any colors to choose from. All your creations must be in black and white. You can create your masterpieces on a 64 by 16 block.

For the example in Figure #1, the DATA would look like this:

```
1000 DATA 1
2000 DATA 191,3,13,3,13,4,12,5,11,6,10
2010 DATA 7,9,8,8,7,9,6,10,5,11,4,12,3,13
```

The first number, 1, represents the total number of objects in the data table. The next number, 191, is the character code for a solid block.

The next numbers the computer needs are the first and last rows of the object, 3 and 13. The remaining 11 groups of two numbers are the beginning and ending row numbers for each column.

If there is more than one object, the number pattern is repeated, beginning with the character code for the next object (and the number of objects given in line 1000 must be changed accordingly).

Apple II series/Valentine's Card

```

10 HOME:PRINT:PRINT TAB(7);"COMPUTER VALENTINE'S CARD"
20 PRINT:PRINT "PRESS <RETURN> AFTER EACH REPLY."
30 PRINT:INPUT "WHO IS THE CARD TO? ";TS:PRINT
40 IF LEN(TS) > 12 THEN PRINT "TOO LONG! TRY AGAIN.":GOTO 30
50 INPUT "WHO IS THE CARD FROM? ";FS
60 IF LEN(FS) > 33 THEN PRINT:PRINT "TOO LONG! TRY AGAIN.":GOTO 50
70 XS = TS+"", WILL YOU BE MY VALENTINE?"
80 YS = "LOVE, "+FS
90 GR:READ NO
100 FOR OB = 1 TO NO:READ KO,Y,Z:COLOR= KO
110 FOR CO = Y TO Z:READ A,B:VLINE A,B AT CO
120 NEXT CO,OB
130 REM GOTO 130
140 VTAB 23:HTAB (40-LEN(XS))/2+1:PRINT XS
150 PRINT TAB((40-LEN(YS))/2+1);YS;
160 GOTO 160
999 REM --NUMBER OF OBJECTS--
1000 DATA 4
1999 REM --OBJECT NUMBER 1--
2000 DATA 15,1,37,10,18,8,20,6,22,5,24,4,25,4,26
2010 DATA 4,27,3,28,3,29,3,30,3,31,3,32,3,33,3,34
2020 DATA 4,35,4,36,5,37,5,38,6,39,5,38,5,37,4,36
2030 DATA 4,35,3,34,3,33,3,32,3,31,3,30,3,29,3,28
2040 DATA 4,27,4,26,4,25,5,24,6,22,8,20,10,18
2999 REM --OBJECT NUMBER 2--
3000 DATA 1,5,33,11,16,9,18,8,19,7,21,7,22,7,23
3010 DATA 7,24,7,25,7,26,7,27,8,28,8,29,9,30,9,31
3020 DATA 10,32,9,31,9,30,8,29,8,28,7,27,7,26,7,25
3030 DATA 7,24,7,23,7,22,7,21,8,19,9,18,11,16
3999 REM --OBJECT NUMBER 3--
4000 DATA 0,10,28,13,17,12,18,11,19,11,20,11,21
4010 DATA 12,22,12,23,13,24,13,25,14,26,13,25,13,24
4020 DATA 12,23,12,22,11,21,11,20,11,19,12,18,13,17
4999 REM --OBJECT NUMBER 4--
5000 DATA 1,15,23,17,19,16,20,16,21,16,22,17,23
5010 DATA 16,22,16,21,16,20,17,19

```

Atari 400/800, 600/800XL, & 130XE/Valentine's Card

```

10 DIM AS(39),CS(39),DS(39),FS(34),HS(1)
20 AS=CHR$(32):AS(39)=AS:AS(2)=AS:HS=CHR$(0)
30 POKE 710,34:POKE 752,1:POKE 82,0:POKE 83,39
40 PRINT CHR$(125):POSITION 5,2
50 PRINT HS;" COMPUTER VALENTINE'S CARD ";HS
60 PRINT:PRINT "PRESS <RETURN> AFTER EACH REPLY."
70 PRINT:PRINT "WHO IS THE CARD TO? ";INPUT CS
80 IF LEN(CS)>12 THEN PRINT:PRINT "TOO LONG! TRY AGAIN.":GOTO 70
90 PRINT:PRINT "WHO IS THE CARD FROM? ";INPUT FS
100 IF LEN(FS)>33 THEN PRINT:PRINT "TOO LONG! TRY AGAIN.":GOTO 90
110 CS(LEN(CS)+1)="", WILL YOU BE MY VALENTINE?"
120 DS="LOVE, ":DS(7)=FS
130 GRAPHICS 3:READ KO,L:SETCOLOR 4,KO,L
140 FOR X=0 TO 2:READ KO,L:SETCOLOR X,KO,L:NEXT X
150 READ NO:FOR OB=1 TO NO:READ CR,Y,Z
160 FOR CO=Y TO Z:READ A,B
170 COLOR CR:PLOT CO,A:DRAWTO CO,B
180 NEXT CO:NEXT OB
190 REM GOTO 190
200 POKE 752,1
210 PRINT:PRINT AS(1,INT((40-LEN(CS))/2));CS
220 PRINT AS(1,INT((40-LEN(DS))/2));DS
230 GOTO 230
999 REM --COLORS AND NUMBER OF OBJECTS--
1000 DATA 0,0,0,14,3,2,4,6,3
1999 REM --OBJECT NUMBER 1--
2000 DATA 1,7,31,6,9,5,10,4,11,3,12,2,13,1,13,0,14,0
2010 DATA 15,0,16,0,16,1,17,2,18,3,19,2,18,1,17,0,16
2020 DATA 0,16,0,15,0,14,1,13,2,13,3,12,4,11,5,10,6,9
2999 REM --OBJECT NUMBER 2--
3000 DATA 3,11,27,6,9,5,10,4,11,3,12,3,13,3,14,4,15

```

```

3010 DATA 5,16,6,17,5,16,4,15,3,14,3,13,3,12,4,11
3020 DATA 5,10,6,9
3999 REM --OBJECT NUMBER 3--
4000 DATA 2,13,25,6,8,5,9,4,10,5,11,6
4010 DATA 12,7,13,8,14,7,13,6,12,5,11,4,10,5,9,6,8

```

Commodore 64 & 128 (C 64 mode)/Valentine's Card

```

10 HS=CHR$(115)
20 POKE 53280,0:POKE 53281,0
30 PRINT CHR$(147);CHR$(150):PRINT
40 PRINT TAB(4);HS;" COMPUTER VALENTINE'S CARD ";HS
50 PRINT:PRINT "PRESS <RETURN> AFTER EACH REPLY."
60 PRINT:INPUT "WHO IS THE CARD TO? ";TS:PRINT
70 IF LEN(TS)>12 THEN PRINT "TOO LONG! TRY AGAIN.":GOTO 60
80 INPUT "WHO IS THE CARD FROM? ";FS
90 IF LEN(FS)>33 THEN PRINT:PRINT "TOO LONG! TRY AGAIN.":GOTO 80
100 XS=TS+"", WILL YOU BE MY VALENTINE?";YS="LOVE, "+FS
110 PRINT CHR$(147):READ NO
120 FOR OB=1 TO NO:READ KO,CH,Y,Z
130 FOR CO=Y TO Z:READ A,B
140 FOR RO=A TO B:POKE 55296+CO+40*RO,KO
150 POKE 1024+CO+40*RO,CH:NEXT RO,CO,OB
160 REM GOTO 160
170 PRINT CHR$(19);CHR$(INT(RND(1)*4+153))
180 POKE 214,22:PRINT
190 PRINT TAB((40-LEN(XS))/2);XS
200 PRINT TAB((40-LEN(YS))/2);YS;
210 GOTO 170
999 REM --NUMBER OF OBJECTS--
1000 DATA 4
1999 REM --OBJECT NUMBER 1--
2000 DATA 1,86,3,35,5,8,4,9,3,10,2,11,2,12,1,13,1,13
2010 DATA 0,14,0,15,0,16,0,16,1,17,1,18,2,18,2,19,3
2020 DATA 20,4,21,3,20,2,19,2,18,1,18,1,17,0,16,0,16
2030 DATA 0,15,0,14,1,13,1,13,2,12,2,11,3,10,4,9,5,8
2999 REM --OBJECT NUMBER 2--
3000 DATA 2,160,7,31,6,8,5,9,4,10,3,11,3,12,3,13,3,14
3010 DATA 4,15,4,16,5,17,5,17,6,18,7,19,6,18,5,17,5,17
3020 DATA 4,16,4,15,3,14,3,13,3,12,3,11,4,10,5,9,6,8
3999 REM --OBJECT NUMBER 3--
4000 DATA 10,214,12,26,7,9,6,10,6,11,6,12,6,13,7,14,8
4010 DATA 15,9,16,8,15,7,14,6,13,6,12,6,11,6,10,7,9
4999 REM --OBJECT NUMBER 4--
5000 DATA 8,83,13,25,8,8,7,9,7,10,8,11,9,12
5010 DATA 9,13,10,14,9,13,9,12,8,11,7,10,7,9,8,8

```

IBM PC & compatibles/Valentine's Card

This program has been tested and found to work on the following computers and hardware configurations using the BASICS shown: IBM PC w/ColorGraphics Monitor Adapter, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. It should also work on many other PC compatibles.

```

10 WIDTH 40:KEY OFF
20 COLOR 12,0,0:HS=CHR$(3):CLS:PRINT
30 PRINT TAB(5);HS;" COMPUTER VALENTINE'S CARD ";HS
40 PRINT:PRINT "PRESS <ENTER> AFTER EACH REPLY."
50 PRINT:INPUT "WHO IS THE CARD TO? ";TS:PRINT
60 IF LEN(TS)>12 THEN PRINT "TOO LONG! TRY AGAIN.":GOTO 50
70 INPUT "WHO IS THE CARD FROM? ";FS
80 IF LEN(FS)>33 THEN PRINT:PRINT "TOO LONG! TRY AGAIN.":GOTO 70
90 XS=TS+"", WILL YOU BE MY VALENTINE?";YS="LOVE, "+FS
100 CLS:READ NO
110 FOR OB=1 TO NO:READ KO,CH,Y,Z
120 FOR CO=Y TO Z:READ A,B
130 FOR RO=A TO B:COLOR KO,0
140 LOCATE RO,CO,0:PRINT CHR$(CH);
150 NEXT RO,CO,OB
160 REM GOTO 160
170 COLOR INT(RND(1)*7)+9,0
180 LOCATE 24,(40-LEN(XS))/2:PRINT XS;
190 LOCATE 25,(40-LEN(YS))/2:PRINT YS;

```


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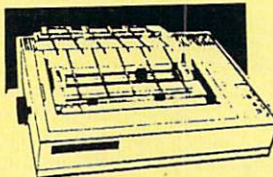
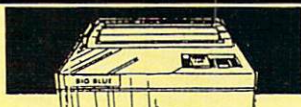
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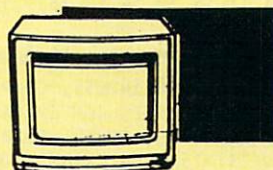
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This is the best values today. Print letters, documents, ect. at 100 characters per second and has Near Letter quality mode. Features are dot addressable graphics, adjustable tractor and friction feed, margin settings, pica, elite, condensed, italics, super & subscript, underline, bold, and double strike. Image writer compatible at half the price. Works with Apple, Laser and Macintosh. List \$349.00 **SALE \$189.95**

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SALE \$89.95 List \$129

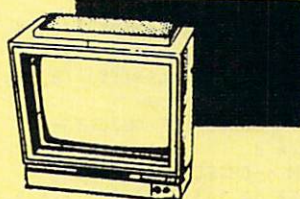
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```

200 GOTO 170
999 REM --NUMBER OF OBJECTS--
1000 DATA 4
1999 REM --OBJECT NUMBER 1--
2000 DATA 15,178,3,35,6,9,5,10,4,11,3,12,3,13,2,14,2
2010 DATA 14,1,15,1,16,1,17,1,18,2,19,3,19,3,20,4
2020 DATA 21,5,22,4,21,3,20,3,19,2,19,2,18,1,17,1,17
2030 DATA 1,16,1,15,2,14,2,14,3,13,3,12,4,11,5,10,6,9
2999 REM --OBJECT NUMBER 2--
3000 DATA 4,219,7,31,7,9,6,10,5,11,4,12,4,13,4,14,4,15
3010 DATA 5,16,5,17,6,18,6,18,7,19,8,20,7,19,6,18,6,18
3020 DATA 5,17,5,16,4,15,4,14,4,13,4,12,5,11,6,10,7,9
3999 REM --OBJECT NUMBER 3--
4000 DATA 13,197,12,26,8,10,7,11,7,12,7,13,7,14,8,15,9
4010 DATA 16,10,17,9,16,8,15,7,14,7,13,7,12,7,11,8,10
4999 REM --OBJECT NUMBER 4--
5000 DATA 12,3,13,25,9,9,8,10,8,11,9,12,10,13,10,14
5010 DATA 11,15,10,14,10,13,9,12,8,11,8,10,9,9

```

Tandy Color Computer/Valentine's Card

```

10 CLEAR 200:CLS:PRINT@35,"COMPUTER VALENTINE'S CARD"
20 PRINT:PRINT "PRESS <ENTER> AFTER EACH REPLY."
30 PRINT:INPUT "WHO IS THE CARD TO?";TS:PRINT
40 IF LEN(TS)>15 THEN PRINT "TOO LONG! TRY AGAIN.":GOTO 0
50 INPUT "WHO IS THE CARD FROM?";FS
60 IF LEN(FS)>25 THEN PRINT:PRINT "TOO LONG! TRY AGAIN.":GOTO 50
70 XS=TS+"", WILL YOU BE MY":YS="LOVE, "+FS
80 CLS:READ NO
90 FOR OB=1 TO NO:READ KO,CH,Y,Z
100 FOR CO=Y TO Z:READ S,L
110 FOR RO=S TO L:PRINT@RO*32+CO,CHR$(CH+KO);
120 NEXT RO,CO,OB
130 REM GOTO 130
140 PRINT@416+(32-LEN(XS))/2,XS;
150 PRINT@459,"VALENTINE?";
160 PRINT@480+(32-LEN(YS))/2,YS;
170 GOTO 170
999 REM --NUMBER OF OBJECTS--
1000 DATA 2
1999 REM --OBJECT NUMBER 1--
2000 DATA 64,143,3,27,3,5,2,6,1,7,1,7,0,8,0,8,0,9,0,9
2010 DATA 1,10,1,10,1,11,2,11,3,12,2,11,1,11,1,10
2020 DATA 1,10,0,9,0,9,0,8,0,8,1,7,1,7,2,6,3,5
2999 REM --OBJECT NUMBER 2--
3000 DATA 48,143,7,23,4,5,3,6,2,7,2,7,2,8,3,8,3,9,4,9
3010 DATA 5,10,4,9,3,9,3,8,2,8,2,7,2,7,3,6,4,5

```

Tandy Model III & 4 (Model III mode)/Valentine's Card

```

10 CLEAR 200:CLS:PRINT@83,"COMPUTER VALENTINE'S CARD"
20 PRINT:PRINT "PRESS <ENTER> AFTER EACH REPLY."
30 PRINT:INPUT "WHO IS THE CARD TO?";TS:PRINT
40 IF LEN(TS)>36 THEN PRINT "TOO LONG! TRY AGAIN.":GOTO 0
50 INPUT "WHO IS THE CARD FROM?";FS
60 IF LEN(FS)>56 THEN PRINT:PRINT "TOO LONG! TRY AGAIN.":GOTO 50
70 XS=TS+"", WILL YOU BE MY VALENTINE?":YS="LOVE, "+FS
80 CLS:READ NO
90 FOR OB=1 TO NO:READ CH,Y,Z
100 FOR CO=Y TO Z:READ S,L
110 FOR RO=S TO L:PRINT@RO*64+CO,CHR$(CH);
120 NEXT RO,CO,OB
130 REM GOTO 130
140 PRINT@896+(64-LEN(XS))/2,XS;
150 PRINT@960+(64-LEN(YS))/2,YS;
160 GOTO 160
999 REM --NUMBER OF OBJECTS--
1000 DATA 2
1999 REM --OBJECT NUMBER 1--
2000 DATA 88,5,57,3,4,3,5,3,5,2,6,2,6,2,7,1,7,1,8,1,8
2010 DATA 1,8,1,8,1,9,1,9,1,9,1,9,1,10,1,10,1,10,2,10

```

```

2020 DATA 2,11,2,11,2,11,2,12,3,12,3,12,4,13,4,13,4,13
2030 DATA 3,12,3,12,2,12,2,11,2,11,2,11,2,10,1,10,1,10
2040 DATA 1,10,1,9,1,9,1,9,1,9,1,8,1,8,1,8,1,8,1,7,2,7
2050 DATA 2,6,2,6,3,5,3,5,3,4
2999 REM --OBJECT NUMBER 2--
3000 DATA 143,9,53,4,4,3,5,3,6,3,6,2,7,2,7,2,7,2,8,2,8
3010 DATA 2,8,2,8,2,9,2,9,2,9,2,9,3,9,3,10,3,10,3,10,4,11
3020 DATA 4,11,4,11,5,12,5,12,5,12,4,11,4,11,4,11,3,10
3030 DATA 3,10,3,10,3,9,2,9,2,9,2,9,2,8,2,8,2,8,2,8
3040 DATA 2,7,2,7,2,7,3,6,3,6,3,5,4,4

```

PROGRAMMING P.S.

Corrections to Previous Months' Programs

Turkey Chase (November 1986, page 78)

Atari 400/800, 600/800XL, & 130XE: When you power up the computer, the built-in screen editor allows only 114 characters per program line. If your Atari 8-bit computer didn't allow you to type in all of line 10, you can solve the problem by breaking it into two lines, like so:

```

10 DIM RG(5),DR(8,2),T(8),BK$(1),DK$(8),DL$(1),DR$(1)
15 DIM DW$(1),K$(1),LT$(1),RT$(1),SP$(1),TAB$(40),UL$(1),UP$(1),UR$(1)

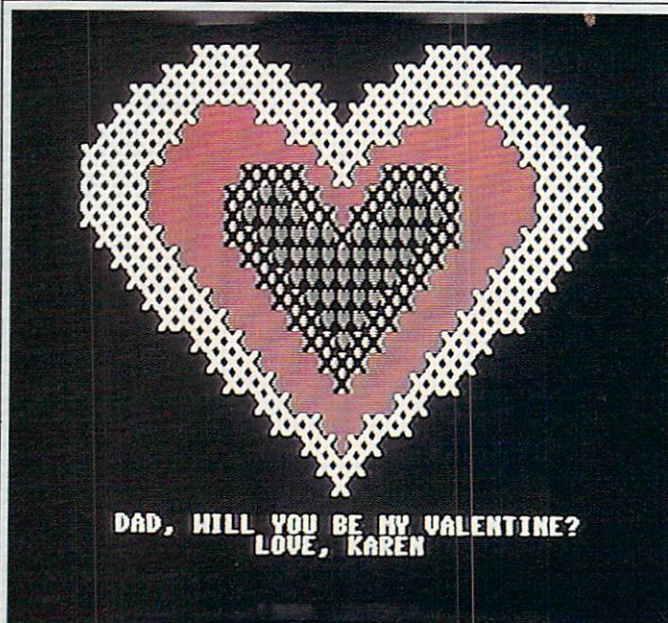
```

Alternatively, entering POKE 82.0 will reset the line-length limit on these computers to 120.

COMPUTERS WE COVER

We regularly present two or more programs in each issue for the Apple II series; Atari 400/800, 600/800XL, & 130XE; Commodore 64 & 128 (in C 64 mode); IBM PC and compatibles; and Color Computer. However, occasionally we have to omit versions when a program requires capabilities that some of these computers lack. For example, many Microtones programs can only run on computers that have three voices, which eliminates the Apple II series; IBM PC and compatibles (except the PCjr with Cartridge BASIC and the Tandy 1000); and Tandy Models III, 4, and Color Computer.

In addition, we publish at least one program each issue for the Adam, Macintosh, Tandy Models III/4, TI-99/4A, and VIC-20. In the future, we also hope to cover the Atari 520ST and the Amiga. This month, these programs can be found here in The Programmer and in Microtones and Compucopia (in the K-POWER section of FAMILY COMPUTING).



DAD, WILL YOU BE MY VALENTINE?
LOVE, KAREN

TIPS TO THE TYPIST

SOME GENERAL RULES

1. Read instructions and program headings carefully.
2. Don't let fatigue and boredom contribute to inaccuracy. If you're new to programming, type in a longer program in easy stages, *SAVING* each installment as you go.
3. Assume that every character in a program listing must be copied accurately if a program is to work.
4. Watch out for potential trouble spots. About 90 percent of all typing errors occur in *DATA* statements.
5. Be aware that our program listings are printed 54 characters wide. Thus, a single BASIC program "line" (sometimes called a "logical line") may appear as several lines in our listing. If you are typing along and reach the right margin of the printed listing, don't press RETURN or ENTER before checking to see if the program "line" you're typing really ends there.
6. To correct an error in a BASIC program line, type the line in again from the beginning, and press RETURN or ENTER to replace the old line.

WHICH PROGRAM WILL RUN ON MY COMPUTER?

- Apple programs run under Applesoft (not Integer) BASIC on the Apple II (with language card), II plus, IIe, and IIfx.
- IBM compatibility of BASIC programs is determined by both the hardware and the version of BASIC used. Our programs for IBM PC and compatibles are composed on IBM PCs and PCjr's, and are tested under most versions of BASIC available for these machines. Each "IBM PC and compatibles" program listing is supplemented by a run-down of the machines and versions of BASIC under which the program is guaranteed to work.
- TI programs not marked "w/TI Extended BASIC" should be run under standard (console) TI BASIC.

DEBUGGING HINTS

1. Write down any error messages you receive.
2. Look up error messages in your manual, and check the indicated lines for simple mistakes. Also check related lines, such as the *DATA* statements corresponding to a READ routine. Correct all the problems you can find, and *SAVE* a corrected copy of the program before typing RUN again.
3. LIST the program in screen-size chunks (check your manual for instructions on how to LIST parts of a program) or get a printout. Compare what you've typed in—letter by letter—to the published program. Make sure that you haven't dropped or mixed up some punctuation, switched uppercase text for lowercase, or vice versa, or miscounted the characters (and/or spaces) between a pair of quotes.
4. Mistakes in *DATA* statements are the single most common cause of program failures. If you can't find your error in the lines the computer specifies, check your *DATA* statements line by line, letter by letter, comma by comma.
5. If all else fails, turn off your computer and relax. Then try again the next day—exhausted proofreaders are careless proofreaders.

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CATCH IT!

BY JOEY LATIMER

Do you think you could catch "IT" if "IT" came up and bit you on the nose? In *Catch IT!*, the word "IT" travels across the screen in the direction of your "catcher". Your job is simply to catch IT by pushing the keys that move your catcher up and down on the screen. While catching IT may sound easy, a choice of three difficulty levels makes IT slippery for even the most skilled player. The number of points you receive increases each time you catch IT, and, to make high scoring possible, you have three rounds in which to accumulate points.



CHOOSE YOUR OWN KEYS

As the *Catch IT!* program is printed in the magazine, pressing "K" causes the catcher to move up, and pressing "M" moves the catcher down. It is easy to modify the program so that other keys can be used instead (say if you want to play left handed). To do this you must change line 40 now read-

ing DNS="M":UPS="K", so that the letter in quotes after DNS= is the letter of the key you want to use to move the catcher down, and the letter in the quotes following UPS= is the key you press to move the catcher up. For example, if you change this program line to DNS="S":UPS="X", then pressing "S" will move the catcher down and pressing "X" will move the catcher up.

Adam/Catch IT!

```
10 LOMEM: 29000:NORMAL
20 sp$ = CHR$(32):cl$ = sp$+sp$:fr$ = sp$
30 FOR a = 2 TO 29:fr$ = fr$+sp$:NEXT a
40 dn$ = "M":up$ = "K"
50 FOR a = 28000 TO 28005:READ t:POKE a,t:NEXT a
60 HOME:PRINT
70 PRINT TAB(5);"Welcome to CATCH IT!"
80 PRINT:PRINT "Use the <<";up$;">> and <<";dn$;">> keys"
90 PRINT "to move your ";CHR$(34);"catcher";CHR$(34)
100 PRINT "up and down. The goal is to"
110 PRINT "catch the word ";:INVERSE:PRINT "IT"
120 NORMAL:PRINT "before it hits the right"
130 PRINT "border of the screen.":PRINT
140 PRINT "Please select the level"
150 PRINT "of difficulty you prefer."
160 PRINT:PRINT "Would you like?":PRINT
170 PRINT "(1) easy,":PRINT "(2) moderate, or"
180 PRINT "(3) hard?":PRINT:PRINT ">";
190 GET k$:IF k$ < "1" OR k$ > "3" THEN 190
200 PRINT k$:dd = VAL(k$)*.5:POKE 16953,0
210 rd = 1:sc = 0
220 HOME:VTAB 10:HTAB 10:PRINT "Get Ready!"
230 FOR de = 1 TO 1000:NEXT de:HOME:INVERSE
240 VTAB 2:HTAB 2:PRINT fr$:HTAB 2:PRINT fr$
250 VTAB 22:HTAB 2:PRINT fr$:HTAB 2:PRINT fr$
260 FOR a = 3 TO 21:VTAB a:HTAB 2:PRINT cl$;
270 HTAB 29:PRINT cl$:NEXT a:NORMAL
```

```
280 VTAB 1:HTAB 11:PRINT "Round: ";rd
290 VTAB 24:HTAB 10:PRINT "Score: ";sc;
300 x = 10:no = 4:ga = 4:CALL 28000
310 y = 4:z = INT(RND(1)*16)+4:ga = ga+(ga < 100)
320 GOSUB 10000
330 hx = z:hy = y:n = RND(1):IF y = 25 THEN 460
340 z = z+dd*((n < .5)-(n > .5))
350 FOR de = 1 TO 20:NEXT de
360 y = y+1:z = z+dd*((z < 4)-(z > 21))
370 VTAB hx:HTAB hy:PRINT cl$;
380 VTAB z:HTAB y:PRINT "IT";
390 k = PEEK(64885):IF k < 1 THEN 330
400 k$ = CHR$(k-32*(k > 96)*(k < 123))
410 CALL 28000:IF k$ <> up$ AND k$ <> dn$ THEN 330
420 IF k$ = dn$ AND x <> 19 THEN 450
430 IF k$ <> up$ OR x = 4 THEN 330
440 GOSUB 20000:x = x-1:GOSUB 10000:GOTO 330
450 GOSUB 20000:x = x+1:GOSUB 10000:GOTO 330
460 VTAB hx:HTAB hy:PRINT cl$;
470 IF z-x > 2.5 OR z-x < 0 THEN y = y+2:GOTO 540
480 VTAB z:HTAB 26:PRINT "*";
490 FOR t = 5 TO ga:PRINT CHR$(7);
500 sc = sc+10*dd:VTAB 24:HTAB 17
510 PRINT sc;:NEXT t
520 VTAB z:HTAB 26:PRINT sp$;
530 FOR de = 1 TO 200:NEXT de:GOTO 310
540 hy = y:y = y+.5:VTAB z:HTAB y:PRINT "IT";
550 VTAB z:HTAB hy:PRINT cl$;IF y < 27 THEN 540
560 rd = rd+1:IF rd < 4 THEN 220
570 HOME:PRINT:PRINT "Sorry, you missed ";:INVERSE
580 PRINT "IT":NORMAL:PRINT "three times!"
590 PRINT:PRINT "Your score was ";sc;" points."
600 PRINT:PRINT "Would you like to"
610 PRINT:PRINT "(1) play again,"
620 PRINT "(2) select a new level, or"
630 PRINT "(3) quit and return to BASIC?"
640 PRINT:PRINT ">";
650 GET k$:IF k$ < "1" OR k$ > "3" THEN 650
660 IF k$ = "1" THEN 210
670 IF k$ = "2" THEN HOME:PRINT:GOTO 140
680 HOME:POKE 16953,95:END
10000 FOR a = x TO x+2:VTAB a:HTAB 27:PRINT CHR$(252);
1010 NEXT a:RETURN
20000 FOR a = x TO x+2:VTAB a:HTAB 27:PRINT sp$;
2010 NEXT a:RETURN
30000 DATA 62,0,50,117,253,201
```

Note: The program begins by turning off the cursor; it turns it back on again when the program ends. If you exit from the program abnormally (e.g., if you have a syntax error or press CONTROL-C), you can turn the cursor back on by typing POKE 16953,95 and pressing RETURN.

Apple II series/Catch IT!

```
10 HOME:PRINT
20 AS$ = "*":C$ = CHR$(32):IS$ = "IT":N1$ = C$+C$
30 FR$ = C$:FOR X = 2 TO 38:FR$ = FR$+C$:NEXT X
40 DNS$ = "M":UPS$ = "K"
50 PRINT TAB(10);"WELCOME TO CATCH IT!"
60 PRINT:PRINT "USE THE <<";UPS$;">> AND <<";DNS$;">> KEYS"
70 PRINT "TO MOVE YOUR ";CHR$(34);"CATCHER";CHR$(34)
80 PRINT "UP AND DOWN. THE GOAL IS TO CATCH"
90 PRINT "THE WORD ";:INVERSE
100 PRINT "IT";:NORMAL:PRINT "BEFORE IT HITS"
110 PRINT "THE RIGHT BORDER OF THE SCREEN.":PRINT
120 PRINT "PLEASE SELECT THE LEVEL"
130 PRINT "OF DIFFICULTY YOU PREFER."
140 PRINT:PRINT "WOULD YOU LIKE?":PRINT
150 PRINT "(1) EASY,":PRINT "(2) MODERATE, OR"
160 PRINT "(3) HARD?":PRINT:PRINT ">";
170 GET K$:IF K$ < "1" OR K$ > "3" THEN 170
180 PRINT K$:DD = VAL(K$)*.5
190 RD = 1:SC = 0
```



```

200 HOME:VTAB 11:HTAB 16:PRINT "GET READY!"
210 FOR DE = 1 TO 1000:NEXT DE:HOME
220 VTAB 3:HTAB 2:INVERSE:PRINT FR$;
230 VTAB 23:HTAB 2:PRINT FR$;
240 VTAB 2:HTAB 2:PRINT FR$;VTAB 24:HTAB 2:PRINT FR$;
250 FOR RO = 4 TO 22:VTAB RO:HTAB 2:PRINT N1$;
260 VTAB RO:HTAB 38:PRINT N1$;NEXT RO:NORMAL
270 VTAB 1:HTAB 16:PRINT "ROUND: ";RD;
280 VTAB 24:HTAB 15:PRINT "SCORE: ";SC;
290 X = 10:NO = 4:GA = 4:POKE -16368,0
300 Y = 4:Z = INT(RND(1)*16)+4:GA = GA+(GA < 100)
310 GOSUB 1000
320 H1 = Z:HY = Y:N = RND(1):IF Y = 32 THEN 430
330 Z = Z+DD*((N > 0.5)-(N < 0.5))
340 Y = Y+1:Z = Z+DD*((Z < 4)-(Z > 22))
350 VTAB H1:HTAB HY:PRINT N1$;
360 VTAB Z:HTAB Y:PRINT IS;
370 K = PEEK(-16384)-128:IF K < 0 THEN 320
380 POKE -16368,0:K$ = CHR$(K-32*(K > 96)*(K < 123))
390 IF K$ <> UP$ AND K$ <> DN$ THEN 320
400 H2 = X:X = X+(K$ = DN$)-(K$ = UP$)
410 X = X+(X < 4)-(X > 20)
420 GOSUB 2000:GOSUB 1000:GOTO 320
430 VTAB H1:HTAB HY:PRINT N1$;
440 IF Z-X > 2.5 OR Z-X < 0 THEN Y = Y+2:GOTO 510
450 VTAB Z:HTAB 33:PRINT ASS
460 FOR T = 5 TO GA:PRINT CHR$(7);
470 SC = SC+10*DD:VTAB 24:HTAB 15
480 PRINT "SCORE: ";SC;NEXT T:
490 VTAB Z:HTAB 33:PRINT CS;
500 FOR DE = 1 TO 200:NEXT DE:GOTO 300
510 HY = Y:Y = Y+.5:VTAB Z:HTAB Y:PRINT IS;
520 VTAB Z:HTAB HY:PRINT N1$;IF Y < 36 THEN 510
530 RD = RD+1:IF RD < 4 THEN 200
540 HOME:PRINT:PRINT "SORRY, YOU MISSED ";
550 INVERSE:PRINT "IT";NORMAL:PRINT " THREE TIMES!"
560 PRINT:PRINT "YOUR SCORE WAS ";SC;" POINTS."
570 PRINT:PRINT "WOULD YOU LIKE TO"
580 PRINT:PRINT "(1) PLAY AGAIN AT THE SAME LEVEL,"
590 PRINT "(2) SELECT A NEW LEVEL, OR"
600 PRINT "(3) QUIT AND RETURN TO BASIC?"
610 PRINT:PRINT "PRESS THE NUMBER OF YOUR CHOICE."
620 PRINT:PRINT ">";
630 GET K$:IF K$ < "1" OR K$ > "3" THEN 630
640 PRINT K$:IF K$ = "3" THEN HOME:END
650 IF K$ = "2" THEN HOME:PRINT:GOTO 120
660 GOTO 190
1000 INVERSE:FOR RO = X TO X+2
1010 VTAB RO:HTAB 34:PRINT CS;NEXT RO
1020 NORMAL:RETURN
2000 FOR RO = H2 TO H2+2:VTAB RO:HTAB 34
2010 PRINT CS;NEXT RO:RETURN

```

Atari 400/800, 600/800XL, & 130XE/Catch IT!

```

10 DIM UP$(1),DN$(1),K$(1)
20 OPEN #1,4,0,"K:"
30 FOR X=1536 TO 1588:READ A:POKE X,A:NEXT X
40 DN$="M":UP$="K"
50 RT=PEEK(106)-4:POKE 106,RT
60 POKE 53277,2:POKE 54279,RT
70 IT=RT*256+512:GRAPHICS 0:PRINT
80 PRINT "Welcome to Catch IT!":PRINT
90 PRINT "Use the <,>,<,> keys to"
100 PRINT "move your ";CHR$(34);"catcher";CHR$(34);
110 PRINT "up and down."
120 PRINT "the word IT before it hits"
130 PRINT "the right border of the screen."
140 PRINT "Please select the level"
150 PRINT "of difficulty you prefer."
160 PRINT:PRINT "Would you like":PRINT
170 PRINT "(1) Easy,"
180 PRINT "(2) Moderate, or"
190 PRINT "(3) Hard?":PRINT:PRINT ">";
190 GET #1,K:IF K<49 OR K>51 THEN 190
200 PRINT CHR$(K);DD=(K-46)/2:SA=(K-48)/2

```

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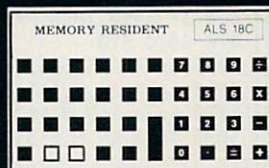
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FUN AND GAMES PROGRAMS

```

210 ROUND=1:SC=0:GA=4:YP=8
220 GRAPHICS 18:POSITION 5,5:PRINT #6;"GET READY!"
230 FOR DE=1 TO 750:NEXT DE
240 GRAPHICS 3:POKE 559,46:POKE 752,1
250 POKE 708,91:POKE 709,168:POKE 710,100
260 COLOR 3:PLOT 0,0:DRAWTO 39,0:DRAWTO 39,19
270 DRAWTO 0,19:DRAWTO 0,0:COLOR 1:PLOT 1,1
280 DRAWTO 38,1:DRAWTO 38,18:DRAWTO 1,18:DRAWTO 1,1
290 COLOR 2:PLOT 2,2:DRAWTO 37,2:DRAWTO 37,17
300 DRAWTO 2,17:DRAWTO 2,2
310 POKE 656,0:POKE 657,5:PRINT "Round: ";ROUND;
320 POKE 657,25:PRINT "Score: ";SC;
330 XI=62:YI=INT(RND(0)*52)+28:POKE 53278,0
340 POKE 704,(INT(RND(0)*15)+1)*16-2
350 POKE 712,INT((RND(0)*16)+1)*16-12
360 COLOR 1:PLOT 35,YP:DRAWTO 35,YP+2
370 U=USR(1536,XI,YI,IT)
380 IF PEEK(764)=255 THEN 440
390 GET #1,K:K=CHR$(K)
400 IF K<>UP$ AND K<>DN$ THEN 440
410 COLOR 0:PLOT 35,YP:PLOT 35,YP+2
420 YP=YP-(K=UP$)+(K=DN$)
430 YP=YP+(YP<3)-(YP>14)
440 N=RND(0):YI=YI+DD*((N>0.5)-(N<0.5))
450 YI=YI+DD*((YI<28)-(YI>80)):XI=XI+1.75
460 IF XI<187 THEN 360
470 IF PEEK(53252)=1 THEN 500
480 ROUND=ROUND+1:IF ROUND>3 THEN 550
490 POKE 53248,0:GOTO 220
500 GA=GA+(GA<100)
510 FOR T=5 TO GA:SOUND 0,T*2,10,15:SC=SC+10*SA
520 POKE 704,T*2:POKE 656,0:POKE 657,25
530 PRINT "Score: ";SC;:NEXT T
540 SOUND 0,0,0,0:POKE 53248,0:GOTO 330
550 POKE 53248,0:GRAPHICS 0:PRINT
560 PRINT "Sorry, you missed it three times!"
570 PRINT:PRINT "Your score was ";SC;" points."
580 PRINT:PRINT "Would you like to"
590 PRINT:PRINT "(1) Play again at the same level,"
600 PRINT "(2) Select a new level, or"
610 PRINT "(3) Quit and return to BASIC?"
620 PRINT:PRINT "Press the number of your choice."
630 PRINT ">";
640 GET #1,K:IF K<49 OR K>51 THEN 640
650 PRINT CHR$(K);:IF K=51 THEN FOR DE=1 TO 100:NEXT D
E:U=USR(58484)
660 IF K=50 THEN PRINT CHR$(125):PRINT:GOTO 140
670 GOTO 210
1000 DATA 104,104,104,141,0,208,104,104,133,0,104,141
1010 DATA 44,6,141,33,6,104,141,32,6,24,101,0,141,43,6
1020 DATA 169,0,162,127,157,0,0,202,208,250,160,3,185
1030 DATA 49,6,153,0,0,136,16,247,96,159,132,132,132

```

Commodore 64 & 128 (C 64 mode)/Catch IT!

```

10 DIM SP(5,3):D1=51163:D2=51164:S=54272
20 FOR X=0 TO 23:POKE S+X,0:NEXT X
30 POKE S+24,15:POKE S+5,68:POKE S+6,68
40 DN$="M":UP$="K"
50 AS$="*":CS=CHR$(32):DL$=CHR$(17)+CHR$(157)
60 NRS=CHR$(146):IS=NRS+"IT":RS=CHR$(18):TS=CHR$(19)
70 QS=RS+CS:PS=QS+DL$+QS+DL$+QS
80 N1$=NRS+CS+CS:N2$=CS+DL$+CS+DL$+CS
90 FR$=RS:FOR X=0 TO 39:FR$=FR$+CS:NEXT X
100 FD$=RS:FOR X=0 TO 23:FD$=FD$+CS+DL$:NEXT X
110 FOR X=49700 TO 49710:READ ML:POKE X,ML:NEXT X
120 FOR X=1 TO 5:FOR Y=1 TO 3:READ SP(X,Y):NEXT Y,X
130 POKE 650,128:POKE 53281,0
140 PRINT CHR$(147):PRINT
150 PRINT TAB(10);"WELCOME TO ";RS;"CATCH IT!";NRS
160 PRINT:PRINT "USE THE <";UP$;"> AND <";DN$;"> KEYS"
170 PRINT "TO MOVE YOUR ";CHR$(34);"CATCHER";CHR$(34)
180 PRINT "UP AND DOWN. THE GOAL IS TO CATCH"
190 PRINT "THE WORD ";RS;"IT";NRS;" BEFORE IT HITS"
200 PRINT "THE RIGHT BORDER OF THE SCREEN.":PRINT

```

```

210 PRINT "PLEASE SELECT THE LEVEL"
220 PRINT "OF DIFFICULTY YOU PREFER."
230 PRINT:PRINT "WOULD YOU LIKE":PRINT
240 PRINT "(1) EASY,":PRINT "(2) MODERATE, OR"
250 PRINT "(3) HARD?":PRINT:PRINT ">";
260 GET K$:IF K$<>"1" AND K$<>"2" AND K$<>"3" THEN 260
270 PRINT K$:DD=VAL(K$)*0.5
280 RD=1:SC=0
290 PRINT CHR$(147):POKE 214,10:PRINT
300 PRINT TAB(15);"GET READY!"
310 FOR DE=1 TO 1000:NEXT DE
320 PRINT CHR$(147);CHR$(31);FR$;CHR$(156);FR$;
330 PRINT CHR$(28);FR$;POKE 214,21:PRINT
340 PRINT CHR$(28);FR$;CHR$(156);FR$;CHR$(31);
350 PRINT LEFT$(FR$,40);:POKE 2023,160:POKE 56295,6
360 PRINT TS;CHR$(31);FD$;
370 FOR X=1 TO 5
380 PRINT TS;SPC(SP(X,1));CHR$(SP(X,2));
390 PRINT LEFT$(FD$,SP(X,3));:NEXT X
400 PRINT TS;CHR$(154);SPC(15);"ROUND: ";RD
410 POKE D2,24:POKE D1,15:SYS 49700:PRINT "SCORE: ";SC;
420 X=10:N0=4:GA=4
430 Y=3:Z=INT(RND(1)*16)+4:GA=GA-(GA<100)
440 POKE D2,X:POKE D1,35:SYS 49700:PRINT PS;
450 H1=Z:HY=Y:N=RND(1):IF Y=33 THEN 560
460 Z=Z+DD*((N>0.5)-(N<0.5))
470 Y=Y+1:Z=Z-DD*((Z<3)-(Z>21))
480 POKE D2,H1:POKE D1,HY:SYS 49700:PRINT N1$;
490 POKE D2,Z:POKE D1,Y:SYS 49700:PRINT IS;
500 GET K$:IF K$<>UP$ AND K$<>DN$ THEN 450
510 H2=X:X=X-(K$=DN$)+(K$=UP$)
520 X=X-(X<3)+(X>19)
530 POKE D2,H2:POKE D1,35:SYS 49700:PRINT N2$;
540 POKE D2,X:POKE D1,35:SYS 49700:PRINT PS;
550 GOTO 450
560 POKE D2,H1:POKE D1,HY:SYS 49700:PRINT N1$;
570 IF Z-X>2.5 OR Z-X<0 THEN 660
580 N0=N0+1:POKE 53280,N0+7:IF N0>7 THEN N0=0
590 POKE D2,Z:POKE D1,34:SYS 49700
600 PRINT CHR$(149+N0);AS$
610 FOR T=5 TO GA:POKE S,14:POKE S+1,T*2:POKE S+4,33
620 SC=SC+10*DD:POKE D2,24:POKE D1,15
630 SYS 49700:PRINT "SCORE: ";SC;:NEXT T:POKE S+4,16
640 POKE D2,Z:POKE D1,34:SYS 49700:PRINT CS;
650 FOR DE=1 TO 200:NEXT DE:POKE 198,0:GOTO 430
660 POKE D2,Z:POKE D1,Y+3:SYS 49700:PRINT IS;
670 RD=RD+1:IF RD<4 THEN 290
680 PRINT CHR$(147):PRINT:PRINT "SORRY, YOU MISSED ";
690 PRINT RS;"IT";NRS;" THREE TIMES!"
700 PRINT:PRINT "YOUR SCORE WAS";SC;"POINTS."
710 PRINT:PRINT "WOULD YOU LIKE TO"
720 PRINT:PRINT "(1) PLAY AGAIN AT THE SAME LEVEL,"
730 PRINT "(2) SELECT A NEW LEVEL, OR"
740 PRINT"(3) QUIT AND RETURN TO BASIC?"
750 PRINT:PRINT "PRESS THE NUMBER OF YOUR CHOICE."
760 PRINT:PRINT ">";
770 GET K$:IF K$<>"1" AND K$<>"2" AND K$<>"3" THEN 770
780 PRINT K$:IF K$="3" THEN PRINT CHR$(147):END
790 IF K$="2" THEN PRINT CHR$(147):PRINT:GOTO 210
800 GOTO 280
1000 DATA 174,220,199,172,219,199,24,32,240,255,96,41
1010 DATA 156,68,82,28,62,117,28,62,78,156,68,39,31,71

```

IBM PC & compatibles/Catch IT!

This program has been tested and found to work on the following computers and hardware configurations using the BASICS shown: IBM PC w/Color/Graphics Monitor Adapter, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. It should also work on many other PC compatibles.

```

10 WIDTH 40:KEY OFF:LOCATE ,0
20 AS$="*":CS=CHR$(32):DL$=CHR$(31)+CHR$(29)
30 QS=CHR$(219):FR$=STRING$(38,QS)
40 DN$="M":UP$="K"
50 PS=QS+DL$+QS+DL$+QS:IS="IT"
60 N1$=CS+CS:N2$=CS+DL$+CS+DL$+CS

```



```

70 CLS:PRINT:COLOR 14,0,1
80 PRINT TAB(10);"Welcome to CATCH IT!";:COLOR 10
90 PRINT:PRINT "Use the <";UP$;"> and <";DN$;"> keys"
100 PRINT "to move your ";CHR$(34);"catcher";CHR$(34)
110 PRINT "up and down. The goal is to catch"
120 PRINT "the word ";:COLOR 15
130 PRINT "IT!";:COLOR 10:PRINT " before it hits"
140 PRINT "the right border of the screen.":PRINT
150 PRINT "Please select the level"
160 PRINT "of difficulty you prefer."
170 COLOR 13:PRINT:PRINT "Would you like":PRINT
180 PRINT "(1) easy,":PRINT "(2) moderate, or"
190 PRINT "(3) hard?":PRINT:PRINT ">";
200 K$=INKEY$:IF K$<"1" OR K$>"3" THEN 200
210 PRINT K$:DD=VAL(K$)*.5
220 RD=1:SC=0
230 CLS:LOCATE 11,16:PRINT "Get Ready!"
240 FOR DE=1 TO 1000:NEXT DE:CLS:COLOR 5,0,9
250 LOCATE 3,3:PRINT RIGHT$(FR$,36)
260 LOCATE 23,3:PRINT RIGHT$(FR$,36);
270 COLOR 4:LOCATE 2,2:PRINT FR$;
280 LOCATE 24,2:PRINT FR$;
290 FOR RO=2 TO 24:LOCATE RO,2:PRINT Q$;
300 LOCATE RO,39:PRINT Q$;NEXT RO
310 COLOR 5:FOR RO=3 TO 23:LOCATE RO,3:PRINT Q$;
320 LOCATE RO,38:PRINT Q$;NEXT RO
330 COLOR 14:LOCATE 1,16:PRINT "Round:";RD
340 LOCATE 25,16:PRINT "Score:";SC;
350 X=10:NO=4:GA=4
360 Y=4:Z=INT(RND*16)+4:GA=GA-(GA<100)
370 LOCATE X,34:PRINT P$;
380 H1=Z:HY=Y:N=RND:IF Y=32 THEN 500
390 Z=Z+DD*((N>.5)-(N<.5))
400 Y=Y+1:Z=Z-DD*((Z<4)-(Z>22))
410 LOCATE H1,HY:PRINT N1$;
420 LOCATE Z,Y:PRINT I$;
430 K$=INKEY$:IF K$="" THEN 380
440 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
450 IF K$<>UP$ AND K$<>DN$ THEN 380
460 H2=X:X=X-(K$=DN$)+(K$=UP$)
470 X=X-(X<4)+(X>20)
480 LOCATE H2,34:PRINT N2$
490 LOCATE X,34:PRINT P$:GOTO 380
500 LOCATE H1,HY:PRINT N1$;
510 IF Z-X>2.5 OR Z-X<0 THEN Y=Y+2:GOTO 590
520 NO=NO+1:IF NO>7 THEN NO=1
530 LOCATE Z,33:COLOR NO+6,0,NO+7:PRINT ASS
540 COLOR 14,0,NO+7:FOR T=5 TO GA
550 SOUND T*25,.5:SC=SC+10*DD:LOCATE 25,16
560 PRINT "Score:";SC;NEXT T:COLOR NO+8,0,NO+7
570 LOCATE Z,33:PRINT C$;
580 FOR DE=1 TO 200:NEXT DE:GOTO 360
590 HY=Y:Y=Y+.5:LOCATE Z,Y:PRINT I$;
600 LOCATE Z,HY:PRINT N1$;IF Y<36 THEN 590
610 RD=RD+1:IF RD<4 THEN 230
620 CLS:COLOR 10,0,1:PRINT:PRINT "Sorry, you missed ";
630 COLOR 15:PRINT "IT!";
640 COLOR 10:PRINT " three times!"
650 PRINT:PRINT "Your score was";SC;"points."
660 COLOR 13:PRINT:PRINT "Would you like to"
670 PRINT:PRINT "(1) play again at the same level,"
680 PRINT "(2) select a new level, or"
690 PRINT "(3) quit and return to BASIC?"
700 PRINT:PRINT "Press the number of your choice."
710 PRINT:PRINT ">";
720 K$=INKEY$:IF K$<"1" OR K$>"3" THEN 720
730 PRINT K$:IF K$="3" THEN CLS:END
740 IF K$="2" THEN CLS:PRINT:GOTO 150
750 GOTO 220

```

Tandy Color Computer/Catch IT!

```

10 CLEAR 200:AS="*":CS=CHR$(32)
20 IS="IT":N1$=CS+CS:N2$=CS
30 PS=CHR$(159):NO=6:P=143

```

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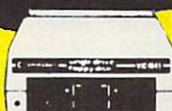


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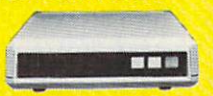
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```

40 DNS="M":UPS="K"
50 CLS:PRINT TAB(5);"WELCOME TO CATCH IT!"
60 PRINT:PRINT "USE THE <";UPS;">";
70 PRINT " AND <";DNS;"> KEYS"
80 PRINT "TO MOVE YOUR ";CHR$(34);"CATCHER";CHR$(34)
90 PRINT "UP AND DOWN. THE GOAL IS"
100 PRINT "TO CATCH THE WORD ";CHR$(34);"IT";CHR$(34)
110 PRINT "BEFORE IT HITS THE"
120 PRINT "RIGHT BORDER OF THE SCREEN."
130 PRINT "PLEASE SELECT THE LEVEL"
140 PRINT "OF DIFFICULTY YOU PREFER."
150 PRINT:PRINT "WOULD YOU LIKE"
160 PRINT "(1) EASY,":PRINT "(2) MODERATE, OR"
170 PRINT "(3) HARD?":PRINT ">";
180 K$=INKEY$:IF K$<"1" OR K$>"3" THEN 180
190 PRINT K$:DD=VAL(K$)*0.5
200 RD=1:SC=0
210 CLS:PRINT@236,"GET READY!"
220 FOR DE=1 TO 800:NEXT DE:CLS
230 FOR CO=33 TO 61:PRINT@CO,CHR$(P+NO*16);
240 PRINT@CO+416,CHR$(P+NO*16);:NEXT CO
250 FOR RO=33 TO 449 STEP 32:PRINT@RO,CHR$(P+NO*16);
260 PRINT@RO+29,CHR$(P+NO*16);:NEXT RO
270 FOR CO=66 TO 93:PRINT@CO,CHR$(P+NO*16);
280 PRINT@CO+352,CHR$(P+NO*16);:NEXT CO
290 FOR RO=66 TO 449 STEP 32:PRINT@RO,CHR$(P+NO*16);
300 PRINT@RO+27,CHR$(P+NO*16);:NEXT RO
310 PRINT@12,"ROUND:";RD:PRINT@492,"SCORE:";SC;
320 X=7:GA=4:NO=1
330 Y=3:Z=RND(9)+3:GA=GA-(GA<100)
340 PRINT@27+X*32,P$;:PRINT@59+X*32,P$;
350 H1=INT(Z):HY=Y:N=RND(10):IF Y=25 THEN 470
360 Z=Z+DD*((N>5)-(N<5))
370 Y=Y+1:Z=Z-DD*((Z<3)-(Z>12))
380 PRINT@HY+H1*32,N1$;:PRINT@Y+INT(Z)*32,I$;
390 K$=INKEY$:IF K$="" THEN 350
400 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
410 IF K$<>UPS AND K$<>DNS THEN 350
420 H2=X:X=X-(K$=DNS)+(K$=UPS)
430 X=X-(X<3)+(X>11)
440 PRINT@27+H2*32,N2$;:PRINT@59+H2*32,N2$;
450 PRINT@27+X*32,P$;:PRINT@59+X*32,P$;
460 GOTO 350
470 PRINT@HY+H1*32,N1$;
480 IF Z-X>1.5 OR Z-X<0 THEN 550
490 NO=NO+1:IF NO=8 THEN NO=1
500 NO=NO-(NO=5):PRINT@26+INT(Z)*32,A$;
510 FOR T=5 TO GA:SC=SC+10*DD:SOUND T,1
520 PRINT @492,"SCORE:";SC;:NEXT T
530 PRINT@26+INT(Z)*32,C$;:P$=CHR$(P+NO*16)
540 FOR DE=1 TO 200:NEXT DE:GOTO 330
550 PRINT@28+INT(Z)*32,I$;
560 FOR DE=1 TO 100:NEXT DE
570 RD=RD+1:IF RD<4 THEN 210
580 CLS:PRINT:PRINT "SORRY, YOU MISSED IT"
590 PRINT "THREE TIMES! YOUR SCORE"
600 PRINT "WAS";SC;"POINTS."
610 PRINT:PRINT "WOULD YOU LIKE TO"
620 PRINT:PRINT"(1) PLAY AGAIN AT THE"
630 PRINT "SAME LEVEL,"
640 PRINT "(2) SELECT A NEW LEVEL, OR"
650 PRINT "(3) QUIT AND RETURN TO BASIC?"
660 PRINT:PRINT ">";
670 K$=INKEY$:IF K$<"1" OR K$>"3" THEN 670
680 PRINT K$:IF K$="3" THEN CLS:END
690 IF K$="2" THEN CLS:PRINT:GOTO 130
700 GOTO 200

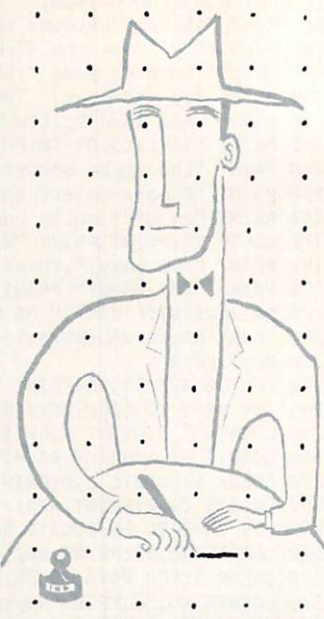
```

DOTS

BY STEVEN C.M. CHEN

Dots is a simple two-player game inspired by the pencil-and-paper version often played in elementary school during long lessons or unpopular films. Sneaky students make a gameboard of evenly spaced dots, slip the piece of paper inside a notebook, and take turns connecting pairs of dots vertically or horizontally. A player who completes a square during a turn occupies the box with his or her initials and goes again. Once all of the dots are joined, the person who has occupied the most boxes wins.

Our on-screen version of *Dots* works the same way but won't slip easily between the pages of a notebook to distract students in a classroom. To play, type in the version for your computer, save it to disk, and type RUN. After you select the grid size you want and enter each player's initials, you are ready to begin. Use the "I" (up),



"J" (left), "K" (down), and "L" (right) keys to move the cursor around the grid, and the space bar to draw a line between two dots. The computer will keep track of whose turn it is, automatically fill in initials when a player completes a square, display players' scores, and announce who wins.

—KAREN KANE

Apple II series/Dots

```

10 DIM SC(1),XR(3),YR(3),NAS(1):NORMAL:SP$ = CHR$(32)
20 BL$ = SP$:FOR L = 2 TO 14:BL$ = BL$+SP$:NEXT L
30 FOR L = 1 TO 3:READ XR(L),YR(L):NEXT L
40 HOME:PRINT TAB(12);"DOTS":PRINT
50 PRINT "PLEASE CHOOSE A GAME BOARD:";PRINT
60 FOR L = 1 TO 3:READ TS:PRINT "<";L;"> ";TS:NEXT L
70 GOSUB 1000:K = K-48:IF K < 1 OR K > 3 THEN 70
80 XM = XR(K):YM = YR(K):DIM P(XM,YM)
90 MAX = (XM-1)*(YM-1)/2:FOR X = 1 TO XM
100 FOR Y = 1 TO YM:P(XM,YM) = 0:NEXT Y,X
110 HOME:FOR L = 0 TO 1
120 PRINT "WHAT ARE PLAYER ";L+1;
130 INPUT "'S INITIALS? ";TS:T = LEN(TS)
140 IF T < 1 OR T > 3 THEN 120
150 IF T = 1 THEN TS = SP$+TS
160 NAS(L) = TS:PRINT:NEXT L
170 IF NAS(0) = NAS(1) THEN 110
180 LM = INT((43-XM*4)/2):TM = INT((21-YM)/2)
190 HOME:FOR Y = 1 TO YM STEP 2:VTAB TM+Y:HTAB LM+1
200 FOR X = 1 TO XM-1:INVERSE:PRINT SP$;:NORMAL
210 PRINT SPC(3);:NEXT X:INVERSE:PRINT SP$:NORMAL
220 NEXT Y:CY = 1:CY = 1:MF = 0
230 FOR L = 0 TO 1:SC(L) = 0:MF = L:GOSUB 2000:NEXT L
240 VTAB 22:HTAB 13:PRINT "<---SCORES--->"
250 VTAB 24:HTAB 15:PRINT NAS(MF);"'S TURN.":SP$;
260 VTAB TM+CY:HTAB LM+CX*4-3+(INT(CY/2) <> (CY/2))*2
270 GOSUB 1000:IF K$ = SP$ THEN 370
280 IF K$ < "I" OR K$ > "L" THEN 270
290 CX = CX+(K$ = "L")-(K$ = "I")
300 DY = (K$ = "K")-(K$ = "I")

```



```

310 CY = CY+DY:IF CX <> XM OR DY = 0 THEN 340
320 CY = CY+DY
330 CY = CY+(YM-1)*((CY = 0)-(CY = (YM+1))):GOTO 350
340 CY = CY+YM*((CY = 0)-(CY = (YM+1)))
350 XZ = XM-(INT(CY/2) <> (CY/2))
360 CX = CX+XZ*((CX = 0)-(CX = (XZ+1))):GOTO 260
370 IF P(CX,CY) <> 0 THEN PRINT CHR$(7);:GOTO 260
380 P(CX,CY) = 1
390 IF INT(CY/2) <> (CY/2) THEN VTAB TM+CY:HTAB LM+CX*
4-2:PRINT "----":GOTO 410
400 VTAB TM+CY:HTAB LM+CX*4-3:PRINT "I"
410 V = 0:IF INT(CY/2) = (CY/2) THEN 490
420 IF CY = 1 THEN 460
430 IF P(CX,CY-1)+P(CX,CY-2)+P(CX+1,CY-1) < 3 THEN 450
440 VTAB TM+CY-1:HTAB LM+CX*4-2:PRINT NAS(MF):V = V+1
450 IF CY = YM THEN 560
460 IF P(CX,CY+1)+P(CX,CY+2)+P(CX+1,CY+1) < 3 THEN 560
470 VTAB TM+CY+1:HTAB LM+CX*4-2:PRINT NAS(MF)
480 V = V+1:GOTO 570
490 IF CX = 1 THEN 530
500 IF P(CX-1,CY-1)+P(CX-1,CY)+P(CX-1,CY+1) < 3 THEN 5
20
510 VTAB TM+CY:HTAB LM+CX*4-6:PRINT NAS(MF):V = V+1
520 IF CX = XM THEN 560
530 IF P(CX,CY+1)+P(CX+1,CY)+P(CX,CY-1) < 3 THEN 560
540 VTAB TM+CY:HTAB LM+CX*4-2:PRINT NAS(MF)
550 V = V+1:GOTO 570
560 IF V = 0 THEN MF = NOT MF:GOTO 250
570 SC(MF) = SC(MF)+V:GOSUB 2000
580 IF SC(0)+SC(1) <> MAX THEN 260
590 VTAB 24:HTAB 15:PRINT BL$;
600 IF SC(0) = SC(1) THEN VTAB 22:HTAB 11:PRINT "THIS
GAME IS A DRAW.";:GOTO 640
610 VTAB 22:HTAB 13:PRINT BL$
620 W = 0:IF SC(1) > SC(0) THEN W = 1
630 VTAB 22:HTAB 16:PRINT NAS(W);" WINS!"
640 VTAB 23:END
1000 GET K$:K = ASC(K$):IF K = 3 THEN VTAB 23:END
1010 K$ = CHR$(K-32*(K > 96)*(K < 123)):RETURN
2000 VTAB 22:HTAB (MF = 1)*30+2
2010 PRINT NAS(MF);" ";SC(MF):RETURN
3000 DATA 5,9,7,13,10,21
4000 DATA SMALL (5 X 5),MEDIUM (7 X 7),LARGE (10 X 11)

```

Commodore 64 & 128 (C 64 mode)/Dots

```

10 DIM SC(1),XR(3),YR(3),NAS(1)
20 POKE 649,2:POKE 650,128:POKE 53280,6:POKE 53281,6
30 HS=CHR$(96):VS=CHR$(98)
40 SP$=CHR$(32):BK$=CHR$(18)+SP$+CHR$(146)
50 BL$=SP$:FOR L=2 TO 14:BL$=BL$+SP$:NEXT L
60 FOR L=1 TO 3:READ XR(L),YR(L):NEXT L
70 PRINT CHR$(147);CHR$(154);TAB(12);"DOTS":PRINT
80 PRINT "PLEASE CHOOSE A GAME BOARD:";PRINT
90 FOR L=1 TO 3:READ TS:PRINT "<";CHR$(48+L);">";
100 PRINT SP$;TS:NEXT L
110 GET K$:IF K$="" THEN 110
120 K=ASC(K$)-48:IF K<1 OR K>3 THEN 110
130 XM=XR(K):YM=YR(K):DIM P(XM,YM):MAX=(XM-1)*(YM-1)/2
140 FOR X=1 TO XM:FOR Y=1 TO YM:P(XM,YM)=0:NEXT Y,X
150 PRINT CHR$(147);:FOR L=0 TO 1:TS=""
160 PRINT "WHAT ARE PLAYER";STR$(L+1);"'S INITIALS";
170 INPUT TS:T=LEN(TS):IF T<1 OR T>3 THEN 160
180 IF T=1 THEN TS=SP$+TS
190 NAS(L)=TS:PRINT:NEXT L:IF NAS(0)=NAS(1) THEN 150
200 LM=INT((43-XM*4)/2)-1:TM=INT((21-YM)/2)-1
210 PRINT CHR$(147);:FOR Y=1 TO YM STEP 2
220 POKE 214,TM+Y:PRINT:PRINT TAB(LM+1);
230 FOR X=1 TO XM-1:PRINT BK$;SPC(3);:NEXT X:PRINT BK$
240 NEXT Y:CY=1:CY=1:MF=0
250 FOR L=0 TO 1:SC(L)=0:PL=L:GOSUB 1000:NEXT L
260 POKE 214,21:PRINT:PRINT TAB(13);"----SCORES----"
270 POKE 214,23:PRINT
280 PRINT TAB(15);CHR$(144);NAS(ABS(MF));"'S TURN.";SP
$;CHR$(154);

```

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FUN AND GAMES PROGRAMS

```

290 IF P(CX,CY)=0 THEN TS=SP$:GOTO 310
300 TS=HS:IF INT(CY/2)=(CY/2) THEN TS=VS
310 XL=LM+CX*4-3-(INT(CY/2)<>(CY/2))*2
320 POKE 214, TM+CY:PRINT:PRINT TAB(XL);BKS
330 FOR D=1 TO 30:NEXT D
340 POKE 214, TM+CY:PRINT:PRINT TAB(XL);TS
350 GET K$:IF K$="" THEN 320
360 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
370 IF K$=SP$ THEN 460
380 IF K$<"I" OR K$>"L" THEN 320
390 CX=CX+(K$="J")-(K$="L"):DY=(K$="I")-(K$="K")
400 CY=CY+DY:IF CX<>XM OR DY=0 THEN 430
410 CY=CY+DY
420 CY=CY+(YM-1)*((CY=(YM+1))-(CY=0)):GOTO 440
430 CY=CY+YM*((CY=(YM+1))-(CY=0))
440 XZ=XM+(INT(CY/2)<>(CY/2))
450 CX=CX+XZ*((CX=(XZ+1))-(CX=0)):GOTO 290
460 IF P(CX,CY)<>0 THEN 290
470 P(CX,CY)=1
480 IF INT(CY/2)=(CY/2) THEN 510
490 POKE 214, TM+CY:PRINT
500 PRINT TAB(LM+CX*4-2);HS;HS;HS;:GOTO 520
510 POKE 214, TM+CY:PRINT:PRINT TAB(LM+CX*4-3);VS;
520 PL=ABS(MF):V=0:IF INT(CY/2)=(CY/2) THEN 610
530 IF CY=1 THEN 580
540 IF P(CX,CY-1)+P(CX,CY-2)+P(CX+1,CY-1)<3 THEN 570
550 POKE 214, TM+CY-1:PRINT
560 PRINT TAB(LM+CX*4-2);NAS(PL):V=V+1
570 IF CY=YM THEN 690
580 IF P(CX,CY+1)+P(CX,CY+2)+P(CX+1,CY+1)<3 THEN 690
590 POKE 214, TM+CY+1:PRINT
600 PRINT TAB(LM+CX*4-2);NAS(PL):V=V+1:GOTO 700
610 IF CX=1 THEN 660
620 IF P(CX-1,CY-1)+P(CX-1,CY)+P(CX-1,CY+1)<3 THEN 650
630 POKE 214, TM+CY:PRINT
640 PRINT TAB(LM+CX*4-6);NAS(PL):V=V+1
650 IF CX=XM THEN 690
660 IF P(CX,CY+1)+P(CX+1,CY)+P(CX,CY-1)<3 THEN 690
670 POKE 214, TM+CY:PRINT
680 PRINT TAB(LM+CX*4-2);NAS(PL):V=V+1:GOTO 700
690 IF V=0 THEN MF=NOT MF:GOTO 270
700 SC(PL)=SC(PL)+V:GOSUB 1000
710 IF SC(0)+SC(1)<>MAX THEN 290
720 POKE 214,23:PRINT:PRINT TAB(15);BLS;
730 IF SC(0)<>SC(1) THEN 760
740 POKE 214,21:PRINT
750 PRINT TAB(10);"THIS GAME IS A DRAW.":GOTO 790
760 POKE 214,21:PRINT:PRINT TAB(13);BLS
770 W=0:IF SC(1)>SC(0) THEN W=1
780 POKE 214,21:PRINT:PRINT TAB(15);NAS(W);" WINS!"
790 POKE 214,21:PRINT:END
1000 POKE 214,21:PRINT
1010 PRINT TAB(-(PL-1)*32);NAS(PL);":":SC(PL):RETURN
2000 DATA 5,9,7,13,10,21
3000 DATA SMALL (5 X 5),MEDIUM (7 X 7),LARGE (10 X 11)

```

IBM PC & compatibles (80-column version)/Dots

This program has been tested and found to work on the following computers and hardware configurations, using the BASICS shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome Printer Card, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/128K RAM, 80-column monitor, & Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. (IBM PCjr owners with 64K RAM should use the 40-column version.) It should work on many other PC compatibles.

```

10 READ SEL:DIM SC(1),XR(SEL),YR(SEL),NAS(1)
20 KEY OFF:COLOR 2,0:READ SW,DM:WIDTH SW
30 BKS=CHR$(219):SP$=CHR$(32)
40 FOR L=1 TO SEL:READ XR(L),YR(L):NEXT L
50 CLS:PRINT TAB(12);"DOTS":PRINT
60 PRINT "Please choose a game board:":PRINT
70 FOR L=1 TO SEL:READ TS:PRINT "<";CHR$(48+L);">";
80 PRINT SP$;TS:NEXT L
90 K$=INKEY$:IF K$="" THEN 90
100 K=ASC(K$):K=K-48:IF K<1 OR K>SEL THEN 100
110 XM=XR(K):YM=YR(K):DIM P(XM,YM):MAX=(XM-1)*(YM-1)/2
120 FOR X=1 TO XM:FOR Y=1 TO YM:P(XM,YM)=0:NEXT Y,X
130 CLS:FOR L=0 TO 1
140 PRINT "What are player";STR$(L+1);"'s initials";
150 INPUT TS:T=LEN(T$):IF T<1 OR T>3 THEN 140

```

```

160 IF T=1 THEN TS=SP$+TS
170 NAS(L)=TS:PRINT:NEXT L:IF NAS(0)=NAS(1) THEN 130
180 LM=INT((SW+3-XM*4)/2):TM=INT((21-YM)/2)
190 CLS:FOR Y=1 TO YM STEP 2
200 LOCATE TM+Y,LM+1:FOR X=1 TO XM-1
210 PRINT BKS;SPC(3);:NEXT X:PRINT BKS
220 NEXT Y:CY=1:CY=1:MF=0
230 FOR L=0 TO 1:SC(L)=0:PL=L:GOSUB 1000:NEXT L
240 LOCATE 22,DM+12,1,0,7
250 COLOR 12:PRINT "<---SCORES--->"
260 LOCATE 24,DM+14:COLOR 15
270 PRINT NAS(ABS(MF));"'s turn.":SP$;:COLOR 2
280 LOCATE TM+CY,LM+CX*4-3+(CY MOD 2)*2
290 K$=INKEY$:IF K$="" THEN 290
300 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
310 IF K$=SP$ THEN 400
320 IF K$<"I" OR K$>"L" THEN 290
330 CX=CX+(K$="J")-(K$="L"):DY=(K$="I")-(K$="K")
340 CY=CY+DY:IF CX<>XM OR DY=0 THEN 370
350 CY=CY+DY
360 CY=CY+(YM-1)*((CY=(YM+1))-(CY=0)):GOTO 380
370 CY=CY+YM*((CY=(YM+1))-(CY=0))
380 XZ=XM-CY MOD 2
390 CX=CX+XZ*((CX=(XZ+1))-(CX=0)):GOTO 280
400 IF P(CX,CY)<>0 THEN SOUND 500,2:GOTO 280
410 P(CX,CY)=1:COLOR 14
420 IF CY MOD 2=1 THEN LOCATE TM+CY,LM+CX*4-2:PRINT ST
RINGS(3,196);:GOTO 440
430 LOCATE TM+CY,LM+CX*4-3:PRINT CHR$(179);
440 COLOR 2:PL=ABS(MF):V=0:IF CY MOD 2=0 THEN 520
450 IF CY=1 THEN 490
460 IF P(CX,CY-1)+P(CX,CY-2)+P(CX+1,CY-1)<3 THEN 480
470 LOCATE TM+CY-1,LM+CX*4-2:PRINT NAS(PL):V=V+1
480 IF CY=YM THEN 590
490 IF P(CX,CY+1)+P(CX,CY+2)+P(CX+1,CY+1)<3 THEN 590
500 LOCATE TM+CY+1,LM+CX*4-2:PRINT NAS(PL)
510 V=V+1:GOTO 600
520 IF CX=1 THEN 560
530 IF P(CX-1,CY-1)+P(CX-1,CY)+P(CX-1,CY+1)<3 THEN 550
540 LOCATE TM+CY,LM+CX*4-6:PRINT NAS(PL):V=V+1
550 IF CX=XM THEN 590
560 IF P(CX,CY+1)+P(CX+1,CY)+P(CX,CY-1)<3 THEN 590
570 LOCATE TM+CY,LM+CX*4-2:PRINT NAS(PL)
580 V=V+1:GOTO 600
590 IF V=0 THEN MF=NOT MF:GOTO 260
600 SC(PL)=SC(PL)+V:GOSUB 1000
610 IF SC(0)+SC(1)<>MAX THEN 280
620 LOCATE 24,DM+14:PRINT STRINGS(11,32);:COLOR 15
630 IF SC(0)=SC(1) THEN LOCATE 22,DM+9:PRINT "THIS GAM
E IS A DRAW.":GOTO 670
640 LOCATE 22,DM+12:PRINT STRINGS(14,32)
650 IF SC(1)>SC(0) THEN W=1 ELSE W=0
660 LOCATE 22,DM+15:PRINT NAS(W);" WINS!"
670 COLOR 2:LOCATE 23,1:END
1000 LOCATE 22,DM-(PL-1)*29+1:COLOR 11
1010 PRINT NAS(PL);":":SC(PL):COLOR 2:RETURN
2000 DATA 5,80,21
3000 DATA 5,9,7,13,10,21,15,21,20,21
4000 DATA Small (5 x 5),Medium (7 x 7),Large (10 x 11)
4010 DATA Extra Large (15 x 11),Jumbo (20 x 11)

```

Tandy Color Computer/Dots

```

10 CLEAR 500:DIM SC(1),XR(3),YR(3),NAS(1)
20 BKS=CHR$(128):HS=CHR$(140):SP$=CHR$(32)
30 BLS=SP$:FOR L=2 TO 14:BLS=BLS+SP$:NEXT L
40 FOR L=1 TO 3:READ XR(L),YR(L):NEXT L
50 CLS:PRINT TAB(12);"DOTS":PRINT
60 PRINT "PLEASE CHOOSE A GAME BOARD:":PRINT
70 FOR L=1 TO 3:READ TS:PRINT "<";CHR$(48+L);">";
80 PRINT SP$;TS:NEXT L
90 K$=INKEY$:IF K$="" THEN 90
100 K=ASC(K$)-48:IF K<1 OR K>3 THEN 90
110 XM=XR(K):YM=YR(K):DIM P(XM,YM):MAX=(XM-1)*(YM-1)/2
120 FOR X=1 TO XM:FOR Y=1 TO YM:P(XM,YM)=0:NEXT Y,X
130 CLS:FOR L=0 TO 1

```


FUN AND GAMES PROGRAMS

```

140 PRINT "PLAYER";STR$(L+1);"'S INITIALS";
150 TS="":INPUT TS:T=LEN(TS):IF T<1 OR T>3 THEN 140
160 IF T=1 THEN TS=SPS+TS
170 NAS(L)=TS:PRINT:NEXT L:IF NAS(0)=NAS(1) THEN 130
180 LM=INT((36-XM*4)/2)-1:TM=INT((13-YM)/2)-1
190 CLS:FOR Y=1 TO YM STEP 2
200 PRINT@32*(TM+Y)+LM,"";:FOR X=1 TO XM-1
210 PRINT BKS;LEFT$(BL$(3),3);:NEXT X:PRINT BKS
220 NEXT Y:CY=1:CY=1:MF=0
230 FOR L=0 TO 1:SC(L)=0:PL=L:GOSUB 1000:NEXT L
240 PRINT@425,"<---SCORES--->";
250 PRINT@490,NAS(ABS(MF));"'S TURN.";SPS;
260 IF P(CX,CY)=0 THEN TS=SPS:GOTO 280
270 IF INT(CY/2)=(CY/2) THEN TS=CHR$(133) ELSE TS=H$
280 SL=32*(TM+CY)+LM+CX*4-4-(INT(CY/2)<>(CY/2))*2
290 PRINT@SL,BKS;:PRINT@SL,TS;
300 K$=INKEY$:IF K$="" THEN 290
310 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
320 IF K$=SPS THEN 410
330 IF K$<"I" OR K$>"L" THEN 290
340 CX=CX+(K$="J")-(K$="L"):DY=(K$="I")-(K$="K")
350 CY=CY+DY:IF CX<>XM OR DY=0 THEN 380
360 CY=CY+DY
370 CY=CY+(YM-1)*((CY=(YM+1))-(CY=0)):GOTO 390
380 CY=CY+YM*((CY=(YM+1))-(CY=0))
390 XZ=XM+(INT(CY/2)<>(CY/2))
400 CX=CX+XZ*((CX=(XZ+1))-(CX=0)):GOTO 260
410 IF P(CX,CY)<>0 THEN SOUND 120,1:GOTO 260
420 P(CX,CY)=1
430 IF INT(CY/2)<>(CY/2) THEN PRINT@32*(TM+CY)+LM+CX*4
-3,H$;H$;H$;:GOTO 450
440 PRINT@32*(TM+CY)+LM+CX*4-4,CHR$(133);
450 PL=ABS(MF):V=0:IF INT(CY/2)=(CY/2) THEN 530
460 IF CY=1 THEN 500
470 IF P(CX,CY-1)+P(CX,CY-2)+P(CX+1,CY-1)<3 THEN 490
480 PRINT@32*(TM+CY)+LM+CX*4-35,NAS(PL);:V=V+1
490 IF CY=YM THEN 600
500 IF P(CX,CY+1)+P(CX,CY+2)+P(CX+1,CY+1)<3 THEN 600
510 PRINT@32*(TM+CY)+LM+CX*4+29,NAS(PL);
520 V=V+1:GOTO 610
530 IF CX=1 THEN 570
540 IF P(CX-1,CY-1)+P(CX-1,CY)+P(CX-1,CY+1)<3 THEN 560
550 PRINT@32*(TM+CY)+LM+CX*4-7,NAS(PL);:V=V+1
560 IF CX=XM THEN 600
570 IF P(CX,CY+1)+P(CX+1,CY)+P(CX,CY-1)<3 THEN 600
580 PRINT@32*(TM+CY)+LM+CX*4-3,NAS(PL);
590 V=V+1:GOTO 610
600 IF V=0 THEN MF=NOT MF:GOTO 250
610 SC(PL)=SC(PL)+V:GOSUB 1000
620 IF SC(0)+SC(1)<>MAX THEN 260
630 PRINT@490,BL$;
640 IF SC(0)=SC(1) THEN PRINT@424,"IT'S IS A TIE.":GOTO
680
650 PRINT@425,BL$;
660 IF SC(1)>SC(0) THEN W=1 ELSE W=0
670 PRINT@427,NAS(W);" WINS!";
680 PRINT@32*14,"";:END
1000 PRINT@416-(PL=1)*24,NAS(PL);":":SC(PL);:RETURN
2000 DATA 5,9,6,11,8,13
3000 DATA SMALL (5 X 5),MEDIUM (6 X 6),LARGE (8 X 7)

```

Tandy Models III & 4 (Model III mode)/Dots

```

10 CLEAR 500:DIM SC(1),XR(3),YR(3),NAS(1)
20 BKS=CHR$(191):SPS=CHR$(32)
30 FOR L=1 TO 3:READ XR(L),YR(L):NEXT L
40 CLS:PRINT TAB(12);"DOTS":PRINT
50 PRINT "Please choose a game board:":PRINT
60 FOR L=1 TO 3:READ TS:PRINT "<";CHR$(48+L);">";
70 PRINT SPS;TS:NEXT L
80 K$=INKEY$:IF K$="" THEN 80
90 K=ASC(K$)-48:IF K<1 OR K>3 THEN 80
100 XM=XR(K):YM=YR(K):DIM P(XM,YM):MAX=(XM-1)*(YM-1)/2
110 FOR X=1 TO XM:FOR Y=1 TO YM:P(XM,YM)=0:NEXT Y,X
120 CLS:FOR L=0 TO 1

```

```

130 PRINT "What are player";STR$(L+1);"'s initials";
140 TS="":INPUT TS:T=LEN(TS):IF T<1 OR T>3 THEN 130
150 IF T=1 THEN TS=SPS+TS
160 NAS(L)=TS:PRINT:NEXT L:IF NAS(0)=NAS(1) THEN 120
170 LM=INT((67-XM*4)/2)-1:TM=INT((13-YM)/2)-1
180 CLS:FOR Y=1 TO YM STEP 2
190 PRINT@64*(TM+Y)+LM,"";:FOR X=1 TO XM-1
200 PRINT BKS;STRING$(3,32);:NEXT X:PRINT BKS
210 NEXT Y:CY=1:CY=1:MF=0
220 FOR L=0 TO 1:SC(L)=0:PL=L:GOSUB 1000:NEXT L
230 PRINT@856,"<---SCORES--->";
240 PRINT@986,NAS(ABS(MF));"'s turn.";SPS;
250 IF P(CX,CY)=0 THEN TS=SPS:GOTO 270
260 IF INT(CY/2)=(CY/2) THEN TS=CHR$(149) ELSE TS=CHR$(
140)
270 SL=64*(TM+CY)+LM+CX*4-4-(INT(CY/2)<>(CY/2))*2
280 PRINT@SL,BKS;:PRINT@SL,TS;
290 K$=INKEY$:IF K$="" THEN 280
300 K=ASC(K$):K$=CHR$(K-32*(K>96)*(K<123))
310 IF K$=SPS THEN 400
320 IF K$<"I" OR K$>"L" THEN 280
330 CX=CX+(K$="J")-(K$="L"):DY=(K$="I")-(K$="K")
340 CY=CY+DY:IF CX<>XM OR DY=0 THEN 370
350 CY=CY+DY
360 CY=CY+(YM-1)*((CY=(YM+1))-(CY=0)):GOTO 380
370 CY=CY+YM*((CY=(YM+1))-(CY=0))
380 XZ=XM+(INT(CY/2)<>(CY/2))
390 CX=CX+XZ*((CX=(XZ+1))-(CX=0)):GOTO 250
400 IF P(CX,CY)<>0 THEN 250
410 P(CX,CY)=1
420 IF INT(CY/2)<>(CY/2) THEN PRINT@64*(TM+CY)+LM+CX*4
-3,STRING$(3,140);:GOTO 440
430 PRINT@64*(TM+CY)+LM+CX*4-4,CHR$(149);
440 PL=ABS(MF):V=0:IF INT(CY/2)=(CY/2) THEN 520
450 IF CY=1 THEN 490
460 IF P(CX,CY-1)+P(CX,CY-2)+P(CX+1,CY-1)<3 THEN 480
470 PRINT@64*(TM+CY)+LM+CX*4-67,NAS(PL);:V=V+1
480 IF CY=YM THEN 590
490 IF P(CX,CY+1)+P(CX,CY+2)+P(CX+1,CY+1)<3 THEN 590
500 PRINT@64*(TM+CY)+LM+CX*4+61,NAS(PL);
510 V=V+1:GOTO 600
520 IF CX=1 THEN 560
530 IF P(CX-1,CY-1)+P(CX-1,CY)+P(CX-1,CY+1)<3 THEN 550
540 PRINT@64*(TM+CY)+LM+CX*4-7,NAS(PL);:V=V+1
550 IF CX=XM THEN 590
560 IF P(CX,CY+1)+P(CX+1,CY)+P(CX,CY-1)<3 THEN 590
570 PRINT@64*(TM+CY)+LM+CX*4-3,NAS(PL);
580 V=V+1:GOTO 600
590 IF V=0 THEN MF=NOT MF:GOTO 240
600 SC(PL)=SC(PL)+V:GOSUB 1000
610 IF SC(0)+SC(1)<>MAX THEN 250
620 PRINT@986,STRING$(11,32);
630 IF SC(0)=SC(1) THEN PRINT@853,"THIS GAME IS A DRAW
.";:GOTO 670
640 PRINT@856,STRING$(14,32);
650 IF SC(1)>SC(0) THEN W=1 ELSE W=0
660 PRINT@858,NAS(W);" WINS!";
670 PRINT@896,"";:END
1000 PRINT@832-(PL=1)*54+1,NAS(PL);":":SC(PL);:RETURN
2000 DATA 5,9,10,13,16,13
3000 DATA Small (5 x 5),Medium (10 x 7),Large (16 x 7)

```

MODIFICATION FOR ANOTHER COMPUTER

IBM PC & compatibles (40-column version)/Dots

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome Printer Card. w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. It should also work on many other PC compatibles.

Use the IBM PC 80-column version with the following alterations. Delete line 4010. Also, change lines 2000 and 3000 to read as follows:

```

2000 DATA 3,4,1
3000 DATA 5,9,7,13,10,19

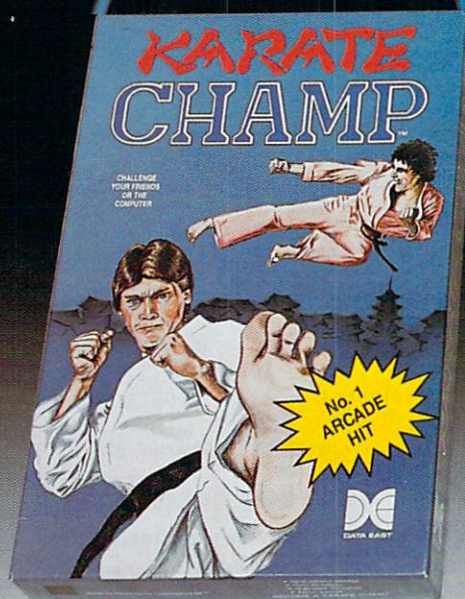
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NUMBER ONE ARCADE HITS...

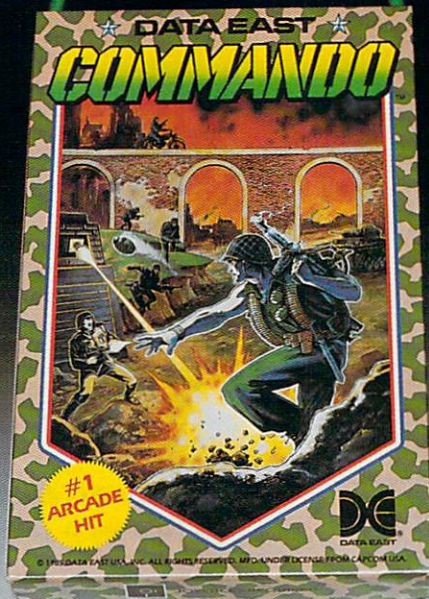


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tag team
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ON C-64™/128

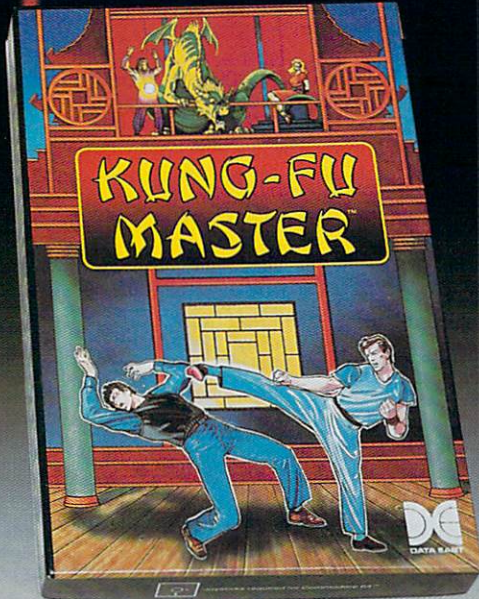
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Edited by Bernadette Grey

Have A Heart
Type in Microtones
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K-POWER

FOR THE COMPUTER GENERATION

A Special K Goodbye and Hello

The Official Special K Farewell Address and Strategy Tips on Life

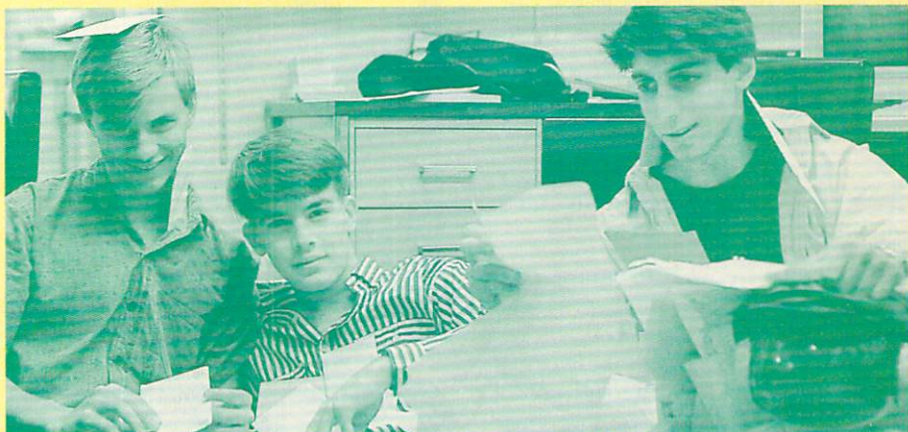
After two years of game playing, hint writing, mail reading, contest judging, and interviewing, the SPECIAL KS—**David Langendoen**, **Damon Osgood**, and **Alex Shakar**—have walked into the proverbial sunset (sigh). Actually, they've taken off to three different universities: David to the University of Virginia; Damon to the State University of New York at Albany; and Alex to Yale University. The trio added a unique quality to FAMILY COMPUTING and set the standards for K-POWER. They put in endless hours of hard work, displayed boundless energy, and consumed more potato chips than the FAMILY COMPUTING staff thought possible. They loved writing the Strategy section. They loved writing Hint Hotline. But most of all, they loved writing blurbs about themselves in the third person so that they could compliment themselves with impunity.

Being ever-thoughtful, the SPECIAL KS took the time to write some final, universal tips on life. (The hints and game are for all lives.)

🔑 First and foremost, **DON'T DIE**. This is because if you die, your game will be over. Not good.

🔑 Predict where the enemy shots will fall and don't be there. This will prevent you from dying. (See the above hint.)

🔑 If your game doesn't seem to be working, plug the computer in. If



Damon, David, and Alex (left to right) miss opening your mail.

the computer is not plugged in, electricity will not enter the machine, and it will not work.

🔑 If your computer is plugged in and you are playing a game, don't unplug the machine. This will make you die. (See the first hint.)

🔑 Read FAMILY COMPUTING.

🔑 Eat. Breathing also helps. (Remember the first hint?)

🔑 Be verbose . . . Be very verbose. If you increase your general verbosity, you will talk and write more, which means you will talk and write more than absolutely necessary, and hence your verbosity will increase, which, in essence means that you are exhaling more carbon dioxide than usual, which in turn helps the plants breathe; this will help humanity as a whole. How do you think we wrote so many Strategy sections?

🔑 Do not fold, spindle, or mutilate.

🔑 And finally, never put an apostrophe in SPECIAL KS.

We are very pleased to introduce to you three new SPECIAL KS (applause). They are: **Jeff Donahue, 18**, **Greg Shakar, 16**, and **Sasha Petraske, 14**. They don't look anything like us. Lucky you. We are confident that K-POWER will carry on in the SPECIAL-K tradition of style, skill, and silliness.

In summation, bye.—**DAVID, DAMON, and ALEX**

NOTE: Hi! We're the new SPECIAL KS, and we're very excited to replace Alex, Damon, and David. We miss them terribly here at K-POWER—but we're glad to have their jobs. Of course, we're all determined to live up to their high standards of top-quality hints, challenging contests, warped senses of humor, and good looks. We hope to get to know many of you in the upcoming months, so keep those letters coming! Pleased to meet you.—*The new SPECIAL KS: JEFF, GREG, and SASHA*

STRATEGY

TIPS, TRICKS, AND HINTS

THE BLACK CAULDRON

Sierra On-Line. Action/Adventure. Your mission: Stop the Horned King from taking over Pridain by destroying the Black Cauldron (his source of power) with the aid of Princess Eilonwy, Gurgi, and Fflewddur Fflam the Bard. (*The hints and game are for Apple, Atari ST, IBM PC & compatibles.*)

🔑 Make friends with Gurgi by giving him crunchings and munchings.

🔑 To avoid getting thirsty, fill your flask.

🔑 To get Henwen to safety, go to the screen filled with bushes. Walk through the bushes and you will go to a hidden cottage. Walk between the first two rocks on the right side of the screen and work your way to the top.

🔑 After you get the magic word, find a tree with a hollow trunk, look inside, and you will get a lute.

🔑 Go to falling water to utilize the magic word.

🔑 Musical instruments will make very good presents for fairies.

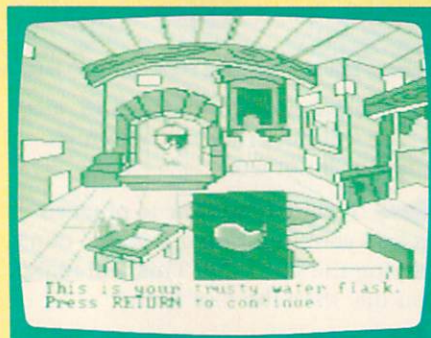
🔑 Don't go to the castle without the dagger from the dead tree, food and water, and the rope.

🔑 To get on the road to the castle, go to the foot of Eagle mountain and go right at the first opportunity. Then, when your head disappears behind the rock, go up. When you can't go up anymore, go left. When your head disappears again, go up again, and then go left. When you stop, go up. Then go left, up, and right, and when you come to the rock with the blue on the right, go up.

🔑 If you get trapped in a cell, make a racket with the cup.



There's a dagger in the frowning tree. You'll want to get that dagger and bring it with you to the castle.



You'll find the flask in the cupboard. Remember to fill the flask with water.

🔑 To get the sword, you must move blocks.

🔑 Turn the gargoyle's head to get out of the dungeon.

🔑 To free Fflewddur Fflam, fly fast, fetch keys, swing your sword, slap the guard silly, and open the door.

🔑 After freeing Fflam, go to the witches' house, open the chest, talk to them, and then give them the sword.

🔑 After the gwythaint takes the cauldron, go back to the castle. Go









You can use the magic word at the waterfall.

to the wine room, go down the chute, go up the stairs, and kick the grating.

🔑 To kill the Horned King, walk to the edge of the platform as if to jump into the cauldron. If you gave Gurgi a crunching and munching, he will save you.

🔑 The witches will offer you wisdom and wealth. If you refuse both, you will get a pleasant surprise. — ADRIAN ROSTON, 15, Brooklyn, New York; HELEN GILDERSLEEVE, 62, O'Neill, Nebraska; MONTY LAWLER, 17, Kasilof, Alaska



			
6 1 9 6 1 2 3 4	two	HORN	S N 

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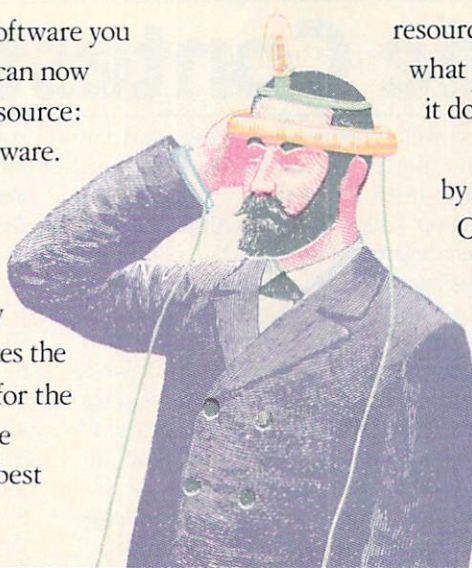
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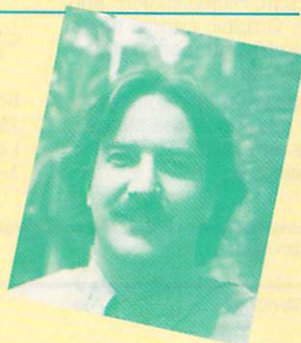
CIRCLE READER SERVICE 62



MUSIC PROGRAMS BY JOEY LATIMER

HEARTBEAT

Each year I feel sorry for my computer because it doesn't get any valentines. This year, while watching *The Wizard of Oz*, I figured out why: My computer needed a heart. So that's just what I gave it. Type in our *Heartbeat* program and then RUN it. And don't be surprised when your computer starts getting phone calls from the Apple of its eye.



ATARI 400/800, 600/800XL, & 130XE/HEARTBEAT

```
10 FOR X=100 TO 200 STEP 20
20 SOUND 0,X,6,16-X/13:NEXT X
30 FOR X=100 TO 200 STEP 10
```

```
40 SOUND 0,X,6,16-X/13
50 NEXT X:SOUND 0,0,0,0
60 FOR DE=1 TO 300:NEXT DE:GOTO 10
```



COMMODORE 64 & 128/HEARTBEAT

```
10 DIM Y(17,2):S=54272
20 FOR X=0 TO 23:POKE S+X,0:NEXT X
30 FOR X=1 TO 13:READ Y(X,1),Y(X,2):NEXT X
40 FOR X=1 TO 9:POKE S+Y(X,1),Y(X,2):NEXT X
50 FOR X=10 TO 13:POKE S+Y(X,1),Y(X,2):NEXT X
60 FOR DE=1 TO 50:NEXT DE
70 POKE S+6,248:POKE S+13,248
80 FOR X=10 TO 13:POKE S+Y(X,1),Y(X,2):NEXT X
90 POKE S+6,244:POKE S+13,244
100 FOR DE=1 TO 300:NEXT DE:GOTO 50
1000 DATA 24,15,5,1,6,248,12,16,13,248,1,2,0,24
1010 DATA 8,1,7,12,4,129,11,129,11,128,4,128
```



MACINTOSH W/MICROSOFT BASIC 2.0 OR 2.1/ HEARTBEAT

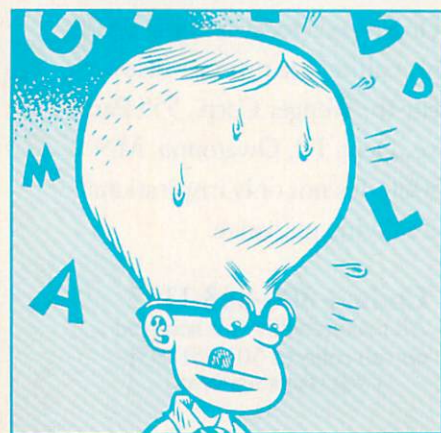
```
10 DIM WX(255)
20 FOR C=0 TO 255
30 WX(C)=INT(RND*255)-128:NEXT C:WAVE 1,WX
40 SOUND 3,3,,1
50 FOR DE=1 TO 200:NEXT DE:SOUND 2,3,,1
60 FOR DE=1 TO 1500:NEXT DE:GOTO 40
```



VIC-20/HEARTBEAT

```
10 FOR X=215 TO 200 STEP -1
20 POKE 36878,X-195:POKE 36677,X
30 POKE 36877,X:NEXT X:POKE 36878,0
40 FOR DE=1 TO 500:NEXT DE:GOTO 10
```

Word Puzzle Contest Winners



K-POWER hackers Jeff, Greg, and Sasha (better known as the SPECIAL Ks) have been up to their eyeballs in "Shop Talk Contest" entries since last September, when the contest appeared in the magazine. For the contest, dozens of readers found all of the computer words that we had hidden in a word puzzle. And, we're embarrassed to admit, some smart alecs even found computer-related words that we had missed. The following readers circled the most legitimate words—so we made them the contest winners and awarded

them \$15 apiece: **Steven Folger, 20**, of Clinton, Maryland; **Michele Feinman, 19**, of Brooklyn, New York; and **Gil Hearn, 14**, of Washington, Georgia.

Here are some of the words they found: DOS, APPLE, MODEM, SAVE, PROGRAM, LIST, CRT, ROM, DISK, END, BIT, MEGABYTE, BASIC, KPOWER, CATALOG, CHIP, FILE, MICRO, CPU, BINARY, MOUSE, START, RESTART, RAM, DUMP, DATA, LOAD, BYTES, and POWER.



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COMPUCOPIA

SHORT PROGRAMS BY JOEY LATIMER

This short program plays tricks on the eyes by weaving multicolored graphics into a three-dimensional pattern. It was inspired by the works of M.C. Escher, the famous graphic artist.

IBM PCjr & COMPATIBLES/3-D MOTIF

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PCjr w/color TV or monitor, & Cartridge BASIC J1.00. Tandy 1000 w/color TV or monitor, & GW-BASIC 2.02 version 01.01.00.

```
10 RANDOMIZE:CLS:WIDTH 40:KEY OFF:LOCATE ,0
20 FOR X=1 TO 8
30 READ KO,COL,A,B:COLOR KO
40 FOR ROW=A TO B
50 LOCATE ROW,COL
60 PRINT CHR$(219)
70 NEXT ROW,X
80 FOR X=1 TO 18
90 READ KO,ROW,A,B:COLOR KO
100 LOCATE ROW,A
110 PRINT STRINGS(B-A+1,219)
120 NEXT X
130 PALETTE INT(RND(1)*4)+1,INT(RND(1)*15)+1
140 FOR DE=1 TO 600:NEXT DE
150 GOTO 130
1000 DATA 1,13,11,13,2,15,7,17,3,17,9,15,4,19,5,19
1010 DATA 4,21,5,19,3,23,9,15,2,25,7,17,1,27,11,13
1020 DATA 4,5,20,20,2,7,16,20,2,7,22,24,3,9,18,18
1030 DATA 3,9,20,22,1,11,14,16,1,11,18,20,1,11,22
1040 DATA 24,1,11,26,26,1,13,14,14,1,13,16,18,1,13
1050 DATA 20,22,1,13,24,26,3,15,18,20,3,15,22,22
1060 DATA 2,17,16,18,2,17,20,24,4,19,20,20
```

TI-99/4A/3-D MOTIF

```
10 CALL CLEAR
20 CALL SCREEN(2)
30 READ SQ$
40 FOR X=2 TO 5
50 READ CHA
60 CALL CHAR(CHA,SQ$)
70 CALL COLOR(X,X*3,1)
80 NEXT X
90 FOR X=1 TO 8
100 READ ROW,COL,CHA,REP
110 CALL VCHAR(ROW,COL,CHA,REP)
120 NEXT X
130 FOR X=1 TO 18
140 READ ROW,COL,CHA,REP
150 CALL HCHAR(ROW,COL,CHA,REP)
160 NEXT X
170 CALL COLOR(INT(RND*4)+2,INT(RND*14)+3,1)
180 FOR DE=1 TO 500
190 NEXT DE
200 GOTO 170
1000 DATA FFFFFFFFFFFFFFFF,43,51,59,67
1010 DATA 11,9,43,3,7,11,51,11,9,13,59,7,5,15
1020 DATA 67,15,5,17,67,15,9,19,59,7,7,21,51
1030 DATA 11,11,23,43,3,5,15,67,3,7,12,51,5
1040 DATA 7,18,51,3,9,14,59,1,9,16,59,3,11,10
1050 DATA 43,3,11,14,43,3,11,18,43,3,11,22,43
1060 DATA 1,13,10,43,1,13,12,43,3,13,16,43,3
1070 DATA 13,20,43,3,15,14,59,3,15,18,59,1
1080 DATA 17,12,51,3,17,16,51,5,19,16,67,1
```

PUT MY COMPUTER IN THE WHITE HOUSE

Every February, we celebrate the birthdays of two of the greatest presidents in our country's history: George Washington and Abraham Lincoln. Many people feel that being the president of the United States is the toughest job there is. Sounds to us like the president's job would be a lot easier if he had a computer. In fact, there are already computers in the White House. Hmm . . . and if the computers had artificial intelligence, they could even help the president make some pretty important decisions. Like making every Monday a national holiday, putting a free Disney World in every state, and making sure everyone in the country has a home. It's a farfetched idea, but fun to think about. If your computer could help the president of the United States make decisions, what kinds of laws would it make? On a separate piece of paper, tell us how your



computer would influence the White House. Send your essay and this contest entry to "Put My Computer

in the White House," K-POWER, 730 Broadway, New York, NY 10003, before February 28.

Name _____ Birthdate _____

Address _____

City _____ State _____ Zip _____

What computer(s) do you own (make and model)? _____

On a separate piece of paper, tell us what laws your computer would make if it were in the White House.

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- Smothered Mates
- Stalemates
- Sacrifices
- Blockades
- Fianchettoes
- The Lucena Position
- King & Pawn Endings
- The Active Rook

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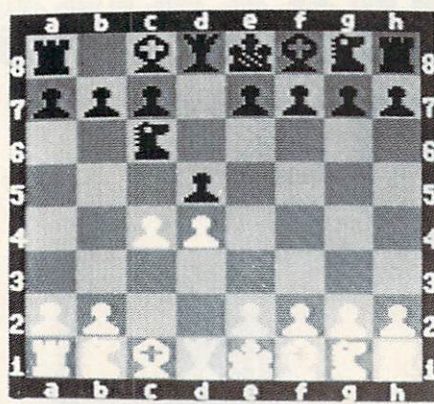
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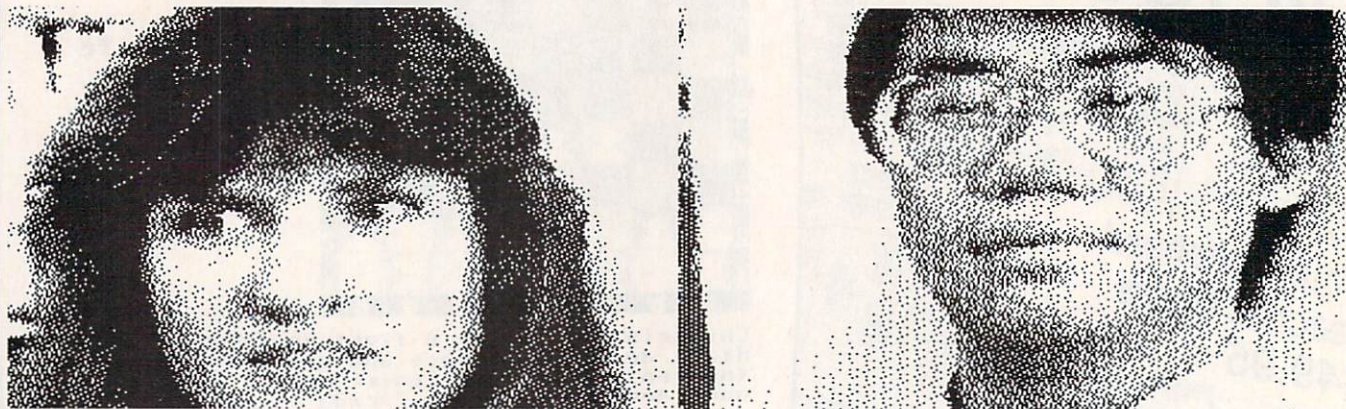
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NEW HARDWARE & ACCESSORIES



Two pictures captured with the Computereyes digitizer and printed with a graphics program.

ACCESSORIES

Computereyes/2

MANUFACTURER: Digital Vision, Inc.
ADDRESS: 14 Oak St., Suite 2, Needham, MA 02192; (617) 444-9040
PRICE: \$130-\$250

HARDWARE COMPATIBILITY: Reviewed on Apple II. Also for Apple IIc, Atari 800/XL/XE, Atari ST, C 64/128, and 192K IBM PC and compatibles.

As an enhancement for graphics software such as *The Print Shop*, *The Newsroom*, and most paint programs, a digitizer is the next best thing to the printer itself. The Computereyes digitizer lets you capture individual pictures with your VCR, video camera, or other video sources (including other computers) and save them into files that can be used subsequently by a wide range of graphics programs.

When we received our review unit, it took less than 10 minutes to set up on an Apple IIe. We inserted the card into a slot (all are usable, including slot 3), and plugged a black-and-white video camera (sold separately by the manufacturer for \$330) into the card's input cord.

The software that runs the digitizer is menu-driven and exceptionally easy to operate; the complete manual was barely glanced at. We asked various people to sit in front of the camera. First, we previewed their digital pictures on the computer's monitor. Then we captured each of their images in a scan of fewer than six seconds, and the resulting picture appeared on screen.

Once placed in a high-res picture file on disk, the image can be insert-

ed into any program that uses such graphics. For example (see picture), the accompanying images were loaded into *Fontrix* and then printed with that program's printout mode. The manufacturer also sells enhancement software that converts standard Apple high-res files into files that can be used by *The Print Shop* and *The Newsroom* (\$25).

Particularly for those who cannot draw, a digitizer opens up a whole new world of pictures for your graphics applications. The Computereyes digitizer is a good device at an excellent price (especially if you already own a video camera). It's a fine adjunct for all sorts of "desktop publishing."

—DAVID HALLERMAN

Mach IV

MANUFACTURER: CH Products
ADDRESS: 1225 Stone Drive, San Marcos, CA 92069; (619) 744-8546
PRICE: \$90-\$140

HARDWARE COMPATIBILITY: Reviewed on Apple IIe/IIc. Also for Amiga, IBM PC, Macintosh.

Is it a joystick? Sure it is; just take a look at the picture. Is it also a mouse? Well yes, that's the best part of the Mach IV—and it's the weakest part, too.

From the CH Products company (manufacturers of the popular Mach II and Mach III joysticks), the Mach IV combines both mouse and joystick functions into one sturdy box. All you have to do is flick a switch on the bottom of the unit to tell it which device to be. (The Apple IIe requires a mouse card.)

As a joystick, the Mach IV is one of the best I've seen, with accurate

movement, large fire buttons, and easy-to-adjust trim tabs for the horizontal and vertical axis. The joystick felt comfortable in my average-sized hands, and the stainless-steel ball at the bottom of the stick indicates a long life ahead. The base of the unit takes up more desk space than the typical joystick, but that helps it feel securely grounded during the rough and tumble of arcade play.

As a mouse, the Mach IV works like a joystick—which means it's more difficult to maneuver delicately than an actual mouse. For applications such as drawing, then, a real mouse (which is easier to stop where you need it) gives you greater control



The Mach IV unit—a mouse is hidden beneath its joystick exterior.

than the Mach IV. However, for productivity purposes, such as writing or working with a spreadsheet, the Mach IV seemed almost as comfortable in use as a mouse. If your desk space is at a premium, you might find the Mach IV a good choice, since it does not demand the same empty area as a mouse does. But if your work is mouse intensive, you'll probably want to stay with a dedicated rodent.

—DAVID HALLERMAN

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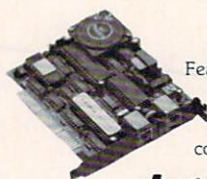
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SOFTWARE GUIDE

Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy, and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. Programs have been evaluated and rated for their performance in each of the categories listed below. More detailed reviews follow the chart. Unless otherwise noted, all programs are in disk format, and minimum memory requirements are 48K for Apple II series, 48K for Atari, 128K for IBM PC/PCjr or compatibles, and 128K for Macintosh. "Atari" alone denotes the 800/XL/XE series. "C 64/128" means the software will run on both a C 64 and a C 128 computer in C-64 mode; "C 128" alone means the software will run only on that machine.

Here's a rundown of the rating categories and what they mean: **O** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system (in the games reviews), the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

HOME BUSINESS & MANAGEMENT

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings						
				O	D	EH	GQ	EU	V	
COMICWORKS Mindscape, Inc. 3444 Dundee Road Northbrook, IL 60062 (312) 480-7667 \$80 ©1986	The name belies the sophistication available in this graphics program that's light-years ahead of <i>MacPaint</i> in capabilities. For instance, documents can now be longer than one page.† —AKER	512K Macintosh. 2nd drive recommended.	90-day warranty. Not copy-protected.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★	
GRAPHICS SCRAPBOOK: CHAPTERS I & II Epyx 600 Galveston Drive Redwood City, CA 94063 (415) 366-0606 \$20-\$25 each ©1986	Two new add-on disks of clip art for <i>The Print Shop</i> or <i>Print-Master</i> . <i>Chapter I</i> offers 104 sports images from baseball to surfing. <i>Chapter II</i> contains "Off the Wall" graphics, such as a superhero and a sad Santa. Fine extras for clip-art fans. —HALLERMAN	Reviewed on IBM PC/PCjr.* Also for 64K Apple, C 64/128.	90-day warranty. \$5 thereafter. Not copy-protected.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★	
MULTISCRIBE StyleWare, Inc. 6405 Hillcroft, Suite 201 Houston, TX 77081 (713) 668-0743 \$60 ©1986	A <i>MacWrite</i> -like word processor that allows you to display on-screen and print text in a wide variety of fonts and type styles. Best for writing letters or other jobs without much editing.† —MILLER	128K Apple IIe/IIc. Dot-matrix printer. Mouse optional.	Sold as is. Not copy-protected.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	E	★ ★ ★ ★	
PARTNER 128 Timeworks, Inc. 444 Lake Cook Road Deerfield, IL 60015 (312) 948-9200 \$70 ©1985, 1986	A cartridge-based, memory-resident desktop accessory that offers an appointment calendar, memo pad, screen dump, and eight more functions. Works well with other 80-column applications on the C 128, but may be overpriced. —BRADLEY	Reviewed on C 128. Also for C 64, IBM PC* (disk).	90-day warranty. Not copy-protected (IBM only).	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	E	★ ★ ★ ★	
THUNDER! Batteries Included 30 Mural St. Richmond Hill, Ontario L4B 1B5, Canada (416) 881-9941 \$40-\$50 ©1986	For checking spelling rapidly, <i>Thunder!</i> can be installed as a desk accessory to verify words as you write or used as a stand-alone program. With an expandable 50,000-word dictionary. Also analyzes text's reading level. —STERN	Reviewed on Atari ST. Also for 512K Macintosh.	90-day warranty. \$10 thereafter. Not copy-protected.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	E	★ ★ ★ ★	

RATINGS KEY **O** Overall performance; **D** Documentation; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

*Titles listed for the IBM PC/PCjr will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

EDUCATION/FUN LEARNING

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings					
				O	D	EH	GQ	EU	V
CONTINENTS AND COUNTRIES CBS Software One Fawcett Place Greenwich, CT 06836 (203) 622-2614 \$40 ©1985	By design, this data base of vital statistics encourages comparisons of over 140 countries in categories such as population, language, and per capita income. Contains three drill-and-practice games. —FRANK	Apple. Color monitor recommended.	90-day warranty. \$5 thereafter.	★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★
CREATIVITY, UNLIMITED Sunburst Communications 39 Washington Ave. Pleasantville, NY 10570 (914) 769-5030 \$59 ©1986	Lessons in thinking graphically range from creating a design using one of 10 shapes to building mosaics, puzzles, and simple animations. No bells and whistles, though, so I had to encourage my kids to play. —ELTGROTH	Apple IIe/IIc. Printer recommended.	Unlimited warranty. Backup included.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★
DRUG ALERT! Learning Well 200 S. Service Road Roslyn Heights, NY 11577 (516) 621-1540 \$50 ©1986	While the pace of the game is slow, kids (ages 8-15) can learn a wide variety of facts about nearly 50 drugs, from the common (nicotine and caffeine) to the more dangerous. The knowledge here is useful. —MORRIS	Apple.	60-day warranty. \$12 for 10 months thereafter. \$12 for backup within 45 days.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★
KID'S STUFF Stone and Associates 7910 Ivanhoe Ave., #319 La Jolla, CA 92037 (619) 459-9173 \$40 ©1983, 1984, 1985	The title is appropriate, as there is "stuff," but nothing extra-special. Intricate graphics in the sections on recognizing words and numbers. Also with typing segment. For kids ages 2-6. —SUTHERLAND	Reviewed on Apple. Also for IBM PC/PCjr.*	90-day warranty. \$5 thereafter. Not copy-protected.	★ ★	★ ★	★ ★ ★	★ ★ ★	E	★ ★
MANAGING FOR SUCCESS Blue Chip Software 6744 Eton Ave. Canoga Park, CA 91303 (818) 346-0730 \$60 ©1986	As the C.E.O. of a manufacturing company, you manage the resources of seven different departments and attempt to build the company. A sterling simulation of basic business concepts.† —RASKIN	256K IBM PC.* 2nd drive optional.	90-day warranty. \$22.50 thereafter or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
MICROZINE, VOL. 15 Scholastic Software 730 Broadway New York, NY 10003 (212) 505-3501 \$40 ©1986	With its usual assortment of Twistaplot adventures (e.g., trying to be reelected President), instruction (like the basics of typing), and games, this volume seems more for younger kids than earlier volumes. —MORRIS	Apple. Color monitor optional.	60-day warranty. \$10 for 10 months thereafter or for backup.	★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★
TIME TRUCKER Green Valley Publishing/ ShareData, Inc. 7122 Shady Oak Road Eden Prairie, MN 55344 (612) 829-0409 \$10 ©1985	In this British import, kids (ages 6+) are shown how to read an analog clock face while using planning and logic and arcade-style fun. Drive a truck from farm to farm, picking up as much produce as you can in eight hours. —SUMMERS	C 64/128. Color monitor recommended. Joystick optional.	Sold as is. Not copy-protected.	★ ★ ★	N/A	★ ★ ★	★ ★ ★	E	★ ★ ★
WALT DISNEY CARD & PARTY SHOP Bantam Electronic Publishing 666 Fifth Ave. New York, NY 10103 (212) 765-6500 \$35-\$40 ©1986	It's party time, so invite your friends as you design invitations, wrapping paper, banners, and more, all starring your favorite Disney characters. If your age is 10 or less, you might need to ask Mom or Dad for help.† —MORRIS	Reviewed on 64K Apple. Planned for C 64/128. Dot-matrix printer. Joystick optional.	90-day warranty. \$5 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
WRITER RABBIT The Learning Company 545 Middlefield Road Menlo Park, CA 94025 (800) 852-2255 \$40 ©1986	These grammar lessons are so cleverly disguised, youngsters (ages 7-10) will play again and again. Cute rewards include printer certificate and colorful screen displays.† —SUMMERS	64K Apple. Color monitor recommended. Dot-matrix printer optional.	90-day warranty. \$15 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★

RATINGS KEY O Overall performance; D Documentation; EH Error-handling; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

*Titles listed for the IBM PC/PCjr will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

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ENTERTAINMENT										
Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings						
				O	D	PS	GQ	EU	V	
BATTLEFRONT Strategic Studies Group, dist. by Electronic Arts 1820 Gateway Drive San Mateo, CA 94404 (415) 571-7171 \$40 ©1986	An excellent menu-driven command system makes this simulation of four World War II battles one of the quickest paced yet. Also offers a fine construction set that lets you build armies and terrain. —DELSON	Reviewed on Apple IIe/IIc. Also for C 64/128.	90-day warranty. \$7.50 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★	
BREAKERS Broderbund Software 17 Paul Drive San Rafael, Ca 94903 (415) 479-1185 \$40-\$45 ©1986	You're a monk who must save the planet Borg from destruction by its twin planet Margo. Many puzzles are solved by talking with other characters; that's the game's strong suit. —ADDAMS	Reviewed on Apple. Also for Atari ST, C 64/128, IBM PC/PCjr.*	90-day warranty. \$7.50 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	E	★ ★ ★ ★	
GBA CHAMPIONSHIP BASKETBALL Gamestar/Activision 2350 Bayshore Frontage Rd. Mountain View, CA 94043 (415) 960-0410 \$35-\$45 ©1986	With many options in its joystick-controlled command system, playing basketball may take a while to learn, but then you'll compete for hours in this compelling, nonstop action game.† —DELSON	Reviewed on C 64/128. Also for Amiga, 128K Apple IIe/IIc, Atari ST, IBM PC/PCjr.* Joystick(s).	90-day warranty. \$7.50 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★	
J-BIRD EasySoft, a division of Automated Logic Systems 3543 Walnut Ave., Bldg. A Cleveland, TN 37311 (615) 472-6376 \$24 ©1985, 1986	A Q-Bert-like arcade game where you move the J-Bird from square to square on various 3-D pyramids, changing the squares' colors as you move. Fast action and fun sound effects make this game a pleasure. —HALLERMAN	Apple. Color monitor, joystick optional.	90-day warranty. \$5 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★	
MARBLE MADNESS Electronic Arts (See above for address and phone) \$35-\$50 ©1986	Home version of popular arcade game contains some of the best graphics ever produced. Maneuver a marble through ramps, chutes, waves, and other tricky paths. Great sound and furious action. —DELSON	Reviewed on Amiga. Also for 128K Apple IIe/IIc, C 64/128. Joystick, mouse.	90-day warranty. \$7.50 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★	
ROADWAR 2000 Strategic Simulations, Inc. 1046 N. Rengstorff Ave. Mountain View, Ca 94043 (415) 964-1200 \$40 ©1986	Set in a future, post-nuclear holocaust America where mutants, outlaws, and survivalists fight it out in armed cars, trucks, and buses. Combines role-playing with war-game combat.—ADDAMS	Reviewed on Apple. Also for C 64/128. Joystick(s).	30-day warranty. \$10 thereafter. \$12 for backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	D	★ ★ ★ ★	
SHANGHAI Activision (See above for address and phone) \$35-\$45 ©1986	One player must remove matched pairs of tiles from playing field, with the goal of clearing the board in this game "derived" from Mah-Jongg. Sounds easy, but it's a serious brain-teaser. —DELSON	Reviewed on Macintosh. Also for 512K Amiga, Apple IIe/IIc, Atari ST, C64/128, 256K IBM PC/PCjr.*	90-day warranty. \$7.50 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★	
STARFLIGHT Electronic Arts (See above for address and phone) \$50 ©1986	An epic outer space role-playing adventure that puts you in charge of an intergalactic spaceship. Highly recommended for those with 200-400 hours to spend.† —DELSON	256K IBM PC.*	90-day warranty. \$7.50 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★	
TASS TIMES IN TONETOWN Activision (See above for address and phone) \$35-\$50 ©1986	Journey to the wacky world of Tonetown to rescue your grandfather. Bold, bright graphics, good music, and a charming and amusing fantasy theme.† —ADDAMS	Reviewed on C 64/128. Also for Amiga, Apple IIe/IIc, Atari ST, IBM PC/PCjr.*Macintosh.	90-day warranty. \$7.50 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★	
TRINITY Infocom 125 Cambridge Park Drive Cambridge, MA 02140 (617) 492-6000 \$40 ©1986	A text-only adventure that takes you to the sites of genuine atomic bomb tests on your quest to save the world from a nuclear war. Evocative prose, fine puzzles.† —ADDAMS	Reviewed on Macintosh. Also for Amiga, 128K Apple IIe/IIc, Atari ST, IBM PC/PCjr.*	90-day warranty. \$5 thereafter. Not copy-protected.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	A	★ ★ ★ ★	
RATINGS KEY O Overall performance; D Documentation; PS Play system; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart *Titles listed for the IBM PC/PCjr will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.										

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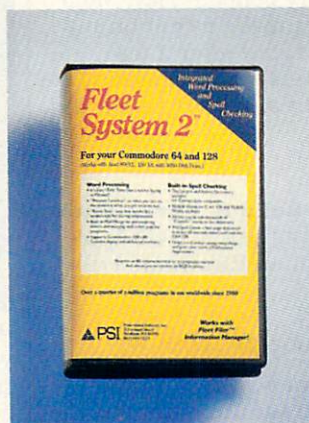
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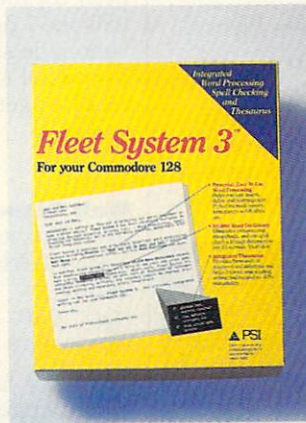
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CIRCLE READER SERVICE 43

SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 94 for information such as backup policies and addresses of software publishers.

EDUCATION/ FUN LEARNING

Managing for Success

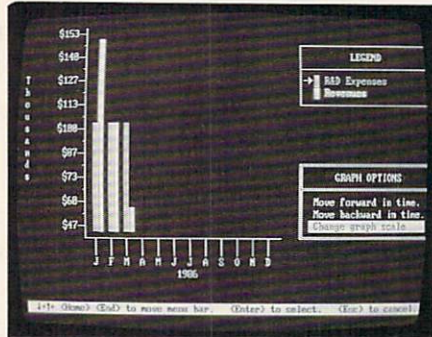
HARDWARE REQUIREMENTS: 256K IBM PC.

PUBLISHER: Blue Chip Software

PRICE: \$60

PUBLISHER'S SUGGESTED AGES: 14+

As a kid, I did my entrepreneurial dreaming over a lemonade stand. Now I have *Managing for Success* (formerly titled *American Dream*) to goad my adult executive fantasies—or my child's knowledge of business operations.



As the Chief Executive Officer (C.E.O.) of a \$100,000,000 manufacturing corporation, I'm the boss. I oversee the activities and expenditures of seven departments: Engineering, Finance, Material Control, Production, Quality Control, Research and Development (R & D), and Sales and Marketing. A single play of the simulation tracks my actions over six years and provides summaries of my company's revenues, profits, market share, and profit margins.

Just as in real life, each action sets off a chain of reactions that determine my total corporate profile. For example, I might increase money for R & D to maintain a technological edge, and then have to convert my sales force from commissioned to national sales reps. I can follow a hot memo and search for new parts suppliers. External forces affect my business too—the country's GNP, the price of parts, and the competi-

tion. Because the game proceeds month by month for years, I might sink to the pits and rise up again.

I get my information on the monitor from monthly and quarterly reports, special memos, and graphs. The graphs are an excellent way of visually sensing financial information. Play is flexible. I can edit the environment to change the type of product manufactured, the inflation rate, or any of 45 parameters that create my business world.

You don't have to be a financial whiz to try this management simulation, but a good command of business vocabulary benefits play. Mom tells me I never made a cent on my lemonade sales, but after a few rounds of *Managing for Success*, I'm ready to get out and start squeezing again.

—ROBIN RASKIN

Walt Disney Card & Party Shop

HARDWARE REQUIREMENTS: 64K Apple.

PUBLISHER: Bantam Electronic Publishing

PRICE: \$40

PUBLISHER'S SUGGESTED AGES: 6+

Are you a fan of Walt Disney's animated characters? Then it's time to party, and they'll do all the inviting.

They will, at least, after you boot up the *Walt Disney Card & Party Shop*, which helps you design an endless variety of theme party invitations, name tags and place cards, signs and banners, wrapping paper, place mats, tickets, and awards. You can also make up greeting cards, letterheads, memos, and envelopes.

It's possible to choose either from several preprogrammed designs or make up materials from scratch, using the more than 100 basic Disney pictures and patterns included on disk. Edit the designs, add text, and move graphics and words around until you're satisfied. Then print out the results as often as you wish; successful designs can be saved on a disk for future use.

I have two reservations about this package. One, I'm not sure how often even an inveterate Disney lover would want to hold a theme party or create Disney letterheads and greeting cards. However, you can answer that best for yourself. My second concern is that there's too much "coloring inside the lines." While there's some room for creativity in selecting and combining patterns

and in cutting out parts of figures, beyond that your work is basically controlled by the software.

Even so, this is an easy-to-use software package that can be enjoyed by everyone from youngsters (those under 10 may need help) to adults.

—TONY MORRIS

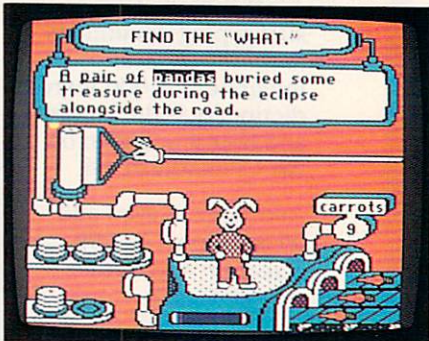
Writer Rabbit

HARDWARE REQUIREMENTS: 64K Apple.

PUBLISHER: The Learning Company

PRICE: \$40

PUBLISHER'S SUGGESTED AGES: 7-10



Writer Rabbit is having a party, and you're invited. But first you'll have to help him make the refreshments by correctly identifying what roles different words and phrases play in Rabbit's silly sentences. Players are shown a phrase and asked to select from a list the answer that best describes it. Choices include "what," "did what," and "how" rather than noun, verb, or adverb. This confused 10-year-old Betsy, who had learned the traditional terminology, but she soon caught on.

The six games progress in difficulty, so we started at the beginning with the ice cream machine. When Betsy correctly answered the question on the first try, she was rewarded with a three-scoop, carrot ice cream cone. Incorrect guessing resulted in fewer scoops, and sometimes we got just the empty cone—accompanied by the correct answer. When we finished the game, we were rewarded by a song and dance from Rabbit.

An easy-to-use option let us change the difficulty of the words used and the number of sentence parts displayed. After Betsy had made carrot cake, ice cream, and juice, she decided to print out a congratulatory certificate. To her delight, the certificate printed quickly.

Finally, Betsy was ready to try the

Rabbit's silly story. The program asked for a dozen or so phrases, each time letting Betsy choose between writing her own or accepting one of its zany options. Rabbit then inserted them randomly into a letter and printed it out, with hilarious results.

One of the few annoyances in this learning game was the program's insistence on switching from Space bar to Return key and back to enter responses. Betsy solved the problem by pressing both every time. Parents will need to be on hand to help children set the options correctly, but kids will gladly take it from there.

—TAN A. SUMMERS

HOME BUSINESS & PRODUCTIVITY

ComicWorks

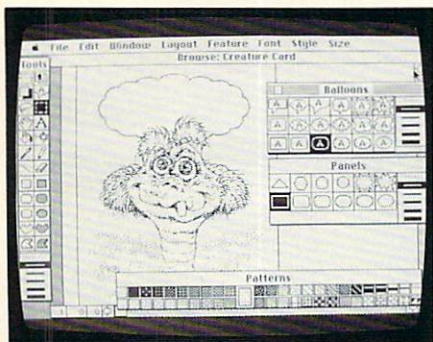
HARDWARE REQUIREMENTS: 512K Macintosh.

PUBLISHER: Mindscape, Inc.

PRICE: \$80

Don't be fooled by the name and packaging: it's not merely for making comic strips. *ComicWorks* is an amazingly versatile graphics program for the Macintosh that's related to *MacPaint* the way the Concorde is related to the Wright brothers' plane.

While *ComicWorks* lets you create artwork as easily as *MacPaint* does, you have more sophisticated tools. The difference is obvious on a fundamental level—your graphic document is not limited to a single page. Another instance of a terrific tool: what was a simple spray can in the



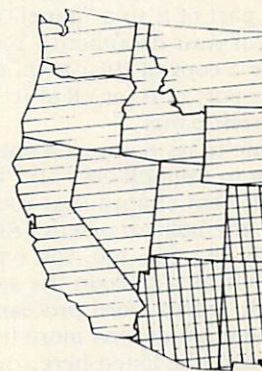
older program is now a spray gun with a range and "flow" that are adjustable.

You put together *ComicWorks* art in layers that can be manipulated at will. Let's say you superimpose a cir-

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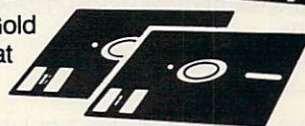
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CIRCLE READER SERVICE 31

FEBRUARY 1987 101

SOFTWARE REVIEWS

cle on a square. Later, you can move either shape, or switch them so the square is on top of the circle. Further options, such as clipping, give you almost unlimited design freedom. With clipping, you can draw an item like an automobile, and show only part of it in a "panel" (a framed area of your document). You could make a copy of the car, and let another part of it, or all of it, show in a different panel.

True to its name and spirit, text areas in *ComicWorks* are "balloons" of different shapes that you select from the balloon palette. All your text is editable, too; you type and edit within a balloon the same way you do with a word processor.

There are dozens more features that can't be listed here; the package even comes with a separate Poster-Maker program that can enlarge your artwork up to 3,200 percent! If you're more serious than *ComicWorks* seems to give you credit for, the same program is available from your dealer or by mail from the publisher under the name *GraphicWorks*. This secondary incarnation has a different manual and a different set of art and templates on disk so you won't take it so lightly, but it's the same program all the same.

—SHARON ZARDETTO AKER

MultiScribe

HARDWARE REQUIREMENTS: 128K Apple IIe/IIc.

PUBLISHER: StyleWare, Inc.
PRICE: \$60

Some word processors are labeled "what you see is what you get" (WYSIWYG) because the text on screen closely resembles what it will look like on paper. *MultiScribe* takes this concept even further. Not only does it show formatting, boldfacing, and underlining, but you can also display and print different fonts and special effects.

The fonts and other features you can use to make your text look unique are what makes *MultiScribe* special. There are menus for changing the font, size, and style of text. It was great fun highlighting a section of text and changing it to a different font. Letters written with the elegant, script-like Shakespeare font were my favorite.

If you don't like the fonts supplied with *MultiScribe*, there is a font edi-

tor you can use to modify an existing font or create a new one. The font editor is as good as any I've ever seen and very easy to use. But the font creation process is still very tedious. I wouldn't endure it unless I was going to use the new font often or for something special.

MultiScribe uses the mouse to provide an environment very similar to that of *MacWrite* on the Macintosh. It's so similar, a friend who has *MacWrite* pointed out a couple of features I had overlooked. All of *MultiScribe*'s functions can be accessed from the keyboard, so a mouse isn't necessary. In fact, I found using a combination of keyboard commands and the mouse best. For example, I particularly loved using the mouse for long cursor moves, but once I learned the commands, the keyboard was easier than using the mouse to get to the pull-down menus.

The generally excellent manual is divided into tutorial and reference sections. The tutorial has step-by-step instructions, with plenty of helpful screen illustrations. But the habit of alternating instructions for mouse and keyboard sometimes made it harder to follow than it could have been.

While *MultiScribe* isn't as powerful as most word processors, it has everything you need for routine letter writing. Its varied fonts and effects, like the outline type style, make it perfect for quick signs and notices. And it can use files created by most other Apple word processors. Best of all, it's fun and easy to use.

—LARRY MILLER

ENTERTAINMENT

GBA Championship Basketball

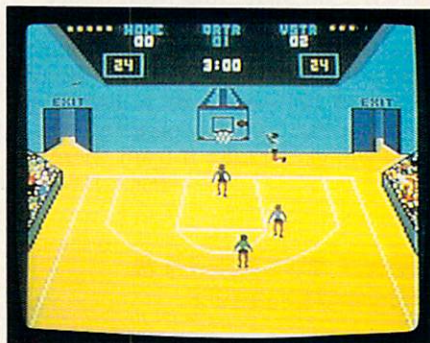
HARDWARE REQUIREMENTS: Amiga, 128K Apple IIe/IIc, Atari ST, C 64/128, IBM PC/PCjr.

PUBLISHER: Gamestar/Activision
PRICE: \$35-\$45

CRITIC'S SUGGESTED AGES: 8+

After the tip-off, relative newcomer Jimbo "Knees" Delson dribbles the ball out and passes to his computerized teammate, "Wilt the Tilt" Dulgage. "Knees" then cuts in beneath the basket, takes a pass from the "Tilt," and goes up for the shot. Yes! It's good!

Sounds simple, but what should be mentioned is that it took about six hours of practice just to get that far. This exciting, flexible, colorful, and realistic basketball simulation is a tough one to learn. There are so many plays to master, so many strategies to consider, and so many combinations of players to choose from that you'd better plan on a lot



of simulated court time before your skills will be good.

GBA (subtitled "Two on Two") allows two players to compete head to head, two players to cooperatively compete against computer opponents, one player to go against the computer, and even multiteam, season-long league play. The joystick-controlled command system takes a while to absorb, but experienced players will find nonstop action for hours in this sports simulation.

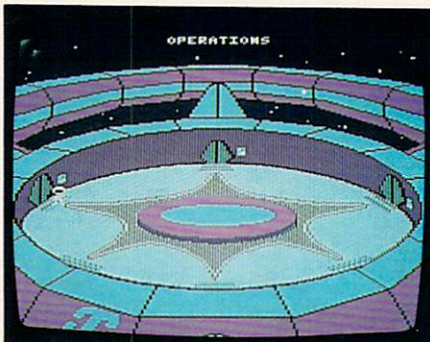
—JAMES DELSON

Starflight

HARDWARE REQUIREMENTS: 256K IBM PC.

PUBLISHER: Electronic Arts
PRICE: \$50

CRITIC'S SUGGESTED AGES: 12+



We were close to the planet that possessed the "cloaking device" we were after when we picked up multiple enemy targets on our scanners. We tried to run, but they were on us in a few seconds. Maneuvering for our

lives, we put our galactic pedals to the titanium, and left them behind in a cloud of our own debris.

If you're a fan of demanding, complex space operas—and would like to participate in a tale of epic proportions—then *Starflight* is your game. You begin by building a low-grade, intergalactic trading vessel, then staff it with a mixed crew of humans, insect creatures, reptiloids, plant people, and robots. In no time at all, you're taking off on explorations, mining for minerals, searching for distant worlds that might be worth colonizing, making gestures of good will toward some alien races, toadying to others, and even doing the odd bit of piracy when the occasion merits it. Ultimately, if you're good enough, you can save your home planet from destruction.

Starflight is an absolute must for those with 200 to 400 hours to spend in front of a monitor. With the ability to create hundreds of graphically detailed planetary systems, each of which can be visited, this game is an enormous outer-space playground. —JAMES DELSON

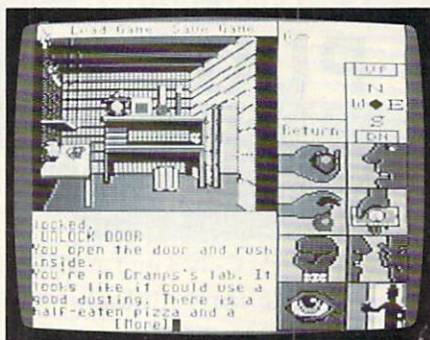
Tass Times in Tonetown

HARDWARE REQUIREMENTS: Amiga, Apple IIe/IIc, Atari ST, C 64/128, IBM PC/PCjr, Macintosh.
PUBLISHER: Activision
PRICE: \$35-\$50
CRITIC'S SUGGESTED AGES: 10+

Tass, in this graphic adventure, does not refer to a Soviet news agency. Tass is slang for "hip" or "radical" in Tonetown, where you will journey to rescue your grandfather, who has been missing since his weird science project opened a door into this odd world. Once there, you've got to "get tass" as quickly as possible. If you don't look like the other Tonetowners—who dress in shiny jumpsuits and wear feathers in their green hair—they won't help, and you'll never find poor Gramps.

Tonetown's most engaging resident is Ennio, the name your dog Spot insists you call him there. Oddly enough, Ennio is a star reporter for the *Tonetown Times*, and the two of you must interview a local rock band, explore a nearby national forest, and do some investigative reporting to dig up clues to Gramps's whereabouts.

Cartoony illustrations are occa-



sionally enlivened with well-done spot animation and music. It's an amusing adventure, with plenty of witty responses besides the puzzles. *Tass Times* is easy enough for novices and entertaining enough for veterans. —SHAY ADDAMS

Trinity

HARDWARE REQUIREMENTS: Amiga, 128K Apple IIe/IIc, Atari ST, C 64/128, IBM PC/PCjr, Macintosh.
PUBLISHER: Infocom
PRICE: \$40
CRITIC'S SUGGESTED AGES: 12+

Infocom's latest "Interactive Fiction Plus" text adventure is filled with clever, neatly interlocked problems that are staged across a broad variety of settings—a tropical island, the Soviet tundra, and even outer space. (These are all sites of actual atomic bomb tests, and Trinity is the code name for the spot where the first nuclear bomb was tested.)

As the story opens in contemporary London, you spy a nuclear missile overhead. Unless you reach a magic door and escape, you and the rest of the world are wiped out in the ensuing atomic war. Make it, and you'll get a chance to save the world by going back through time to change history. On the other side of that door awaits a world as enchanting as that of Zork, a world where twin suns light the sky and mushrooms grow taller than redwoods.

Some mushrooms have tiny doors, and once you've learned the trick, they lead through time and space to other locations. In each setting, you find another puzzle to solve, but you must do so before the weapon being tested there detonates. *Trinity* mixes logic and magic with history and fiction. Often poetic in its imagery, the evocative prose is as entertaining to read as the puzzles are to solve. —SHAY ADDAMS

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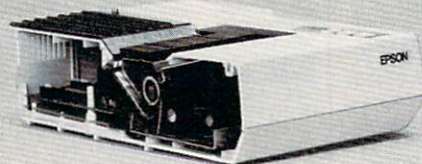
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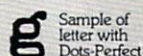
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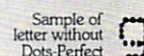
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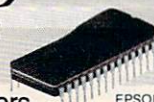
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